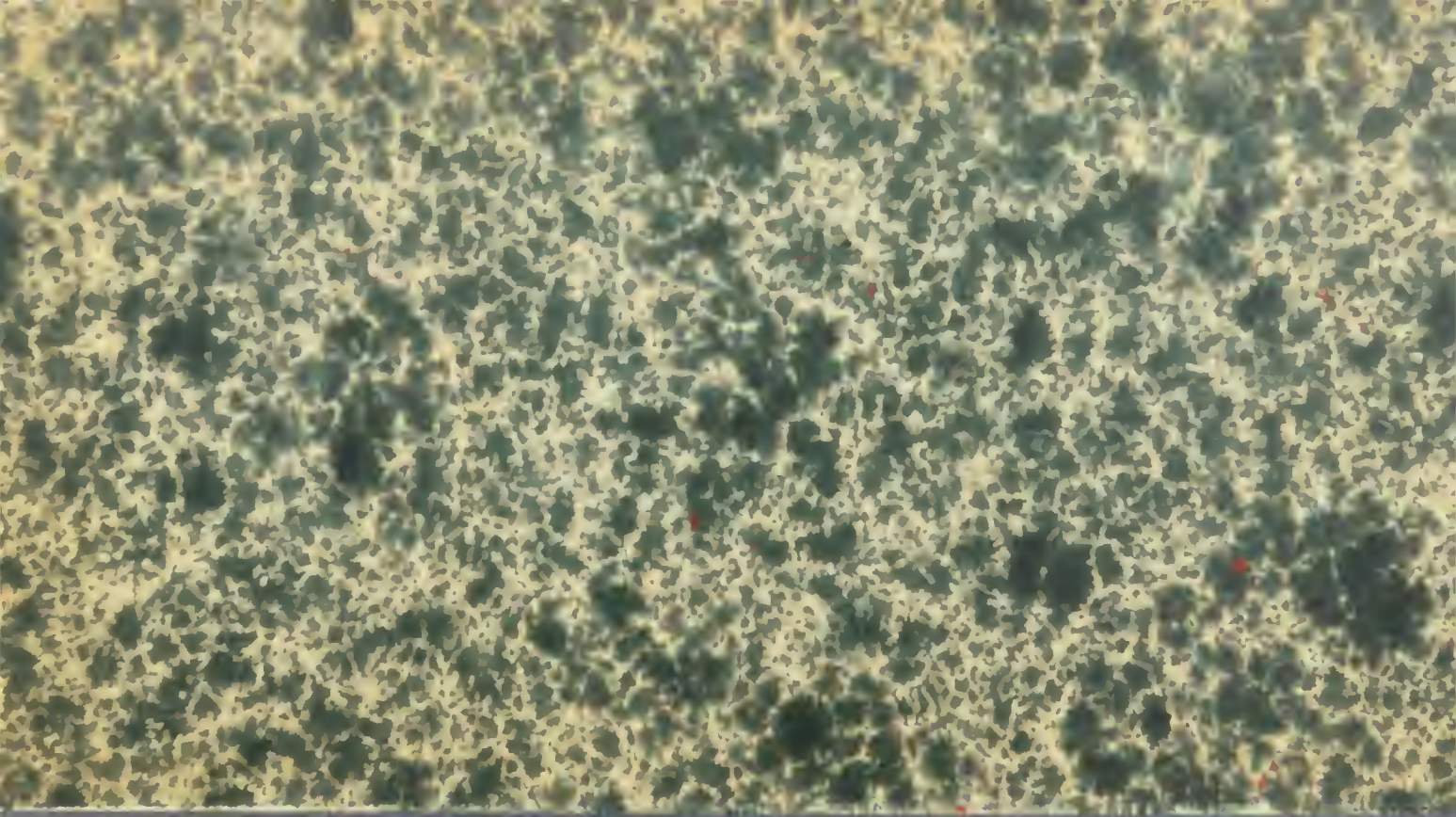

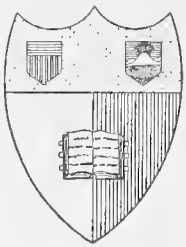

PUBLICATIONS

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New Series. No. 2.

THE FEDERAL CENSUS

CRITICAL ESSAYS

BY MEMBERS OF THE

AMERICAN ECONOMIC ASSOCIATION

COLLECTED
AND EDITED BY
A SPECIAL COMMITTEE

MARCH, 1899.

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AMERICAN ECONOMIC ASSOCIATION
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Edited by H. Hillers as Secretary of the American Economic Association Appeared just as work began on the Twelfth Census and was largely responsible for the appointment of Prof. Hillers a few months later as Chief Statistician in charge of the Division of Methods and Results in the Census Office

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CONTENTS.

REPORT OF THE COMMITTEE ON THE SCOPE AND METHOD OF THE TWELFTH CENSUS.

The Association at its Cleveland meeting in December, 1897, authorized the appointment of a Committee to inquire into the scope and method of the eleventh census, with a view of determining what ought to be attempted at the next. This Committee was duly appointed, and begs to report as follows :[1]

The Committee determined to undertake a review of the eleventh census; and for this purpose it invited various members of the Association and others to coöperate by preparing critical articles on particular portions of the census. In order to extend this coöperation still further, and especially to discover what might seem weak points in the eleventh census, and inquiries desirable to be elaborated in the twelfth, it addressed a circular letter to all the members of the Association asking them to reply to certain questions.[2]

[1] Presented to the Association, December 28, 1898.

[2] The letter was as follows :

DEAR SIR :—At the meeting of the Association in Cleveland, Dec. 29–31, 1897, a committee was appointed to consider *The Scope and Method of the Twelfth Census*. The committee proposes to make a study of the methods and results of the last census for the purpose of suggesting what may reasonably be expected from the next. The effort, however, will be constructive rather than destructive, its chief object being to form an intelligent public opinion upon this important scientific undertaking,—the most important of the kind in the world. The committee has secured the coöperation of a number of members of the Association interested in particular portions of the subject. An analysis will be made of the more important topics of census inquiry, under the following heads :—

The circular letter was not successful; only about sixty replies were received. Doubtless many members of the Association, while interested in the census, did not consider it worth while to answer the inquiries unless they had some specific criticism or recommendation to make. Some replies were of considerable value in pointing out errors in the eleventh census and making suggestions for the twelfth, and they have been utilized by the committee and by the persons making special reports. A brief digest of them will be prepared by the Committee to accompany the papers if they are published in monograph form.

On the other hand, the invitation to coöperate with the Committee in carefully reviewing certain portions

a. Methods and results of the last census.

b. Scope and method of the twelfth census.

c. Experience of other countries, references and bibliography.

These studies will be edited by the committee, reported upon at the next meeting of the Association, discussed, and (if the Association approve) the whole printed as a monograph. It is believed that such a work will furnish a basis for scientific judgment, will concentrate intelligent opinion upon the census and be a contribution of permanent value to the science of statistics.

The committee respectfully asks your coöperation in this undertaking by answering the questions on the accompanying sheet and making such other suggestions as you may deem important. All replies will be treated as confidential and they need not be signed.

Very truly yours,

RICHMOND MAYO-SMITH,
WALTER F. WILLCOX,
CARROLL D. WRIGHT,
ROLAND P. FALKNER,
DAVIS R. DEWEY,
Committee.

(a) Have you made use of the eleventh census and if so, of the Abstract, Compendium or Quarto Volumes? (b) Which volumes or parts have you found most useful? (c) Have you detected any gross errors in the eleventh census and if so, what are they? (d) Is there any special information which you think might be furnished by the twelfth census and which is not in the eleventh census?

of the census work met with the heartiest response. The result is a series of papers by independent authors upon specific topics which together constitute a very valuable commentary upon the federal census and statistical method in general. The Committee made no effort to supervise these contributions, even to the extent of securing uniformity of treatment or proportionate length. Nor did the variety of topics demand the same kind of treatment. Each author was obliged, therefore, to interpret, according to his own notions, the general plan of the Committee as outlined in their letter, and to carry it out as the nature of the subject allowed. While the essays vary in length and in method yet each will be found complete in itself and following the central idea, viz.: a review of the method and results of the eleventh census with a view to furnishing suggestions regarding the scope and method of the next. Each author is responsible for his own assertions, both of fact and opinion, and in no case should the Committee be held to indorse the views or conclusions of the contributors. The Committee believes, however, that all the essays have been written without personal bias or prejudice and with a sincere desire to advance the interests of science and of good statistical method in our census work.

The Committee has not considered critically all the points raised in these elaborate papers but submits the following general conclusions:

I. Throughout the papers, there is criticism not so much of the accuracy of the census returns as of the treatment of the data and of a lack of continuity from census to census. Both defects we believe to be largely due to the insufficient time allowed by law for preparing plans and schedules. Among the most effective means of overcoming these difficulties are the establishment of

a permanent census organization, which this association has already advocated, and its subordination to civil service rules.

II. The Committee believes that the work of the census is seriously impeded by the number and variety of the investigations ordered, and that in consequence fundamental inquiries cannot receive adequate attention. A number of subordinate inquiries might advantageously be transferred to established bureaus or departments which are equipped with expert agents and some of which now publish annual volumes of kindred statistics. By this means the duplication of reports would be avoided or minimized; and with legislation giving such offices power and means to secure adequate returns, the results would be more satisfactory. The following subjects might be transferred to the offices named: Irrigation to the Department of Agriculture or the Geological Survey; Fisheries to the Fish Commission; Mineral Industries to the Geological Survey; Land Transportation to the Interstate Commerce Commission; Water Transportation to the proper bureau of the Treasury Department; Statistics of Schools to the Bureau of Education; Indians (except their enumeration) to the Bureau of Indian Affairs; Real Estate Mortgages to the Department of Labor.

III. The following analysis of various classes of defects or weaknesses in method which have been emphasized by the writers of the papers may be suggestive.

1. The lack of comparability in the data from census to census. This is not in itself a defect provided that the successive census enumerations represent improvement. It is discussed in several places as follows: the grouping of occupations, especially the inclusion of miners first under manufactures, then under agriculture;

the classification changes also in minor points. (Mayo-Smith); the impossibility of comparing employment of children in the tenth and eleventh censuses on account of the different age classification. (Mayo-Smith); in the statistics of manufactures, changes in the definition of capital. (North); differences in methods of estimating national wealth. (Plehn).

2. The lack of co-ordination. After the census of population, the most important work of the census is devoted to statistics of the productive industries—agriculture, manufactures, mining, and fisheries. These inquiries should be more closely associated in method of presentation with one another, so that more of the facts available in one might be available in the others, as for instance the number of persons employed, the capital invested, the wages paid, etc. A still further lack of uniformity is found in the methods of tabulation pursued in the different volumes. The general geographical groupings of the states adopted in the volumes on Population should be preserved throughout the other volumes, with special groupings for particular conditions. The lack is also seen in the relation of different branches of investigation. For instance, facts are asked with regard to criminals which are not asked in regard to the general population. (Falkner). The statistics of school attendance are not adequately compared with similar statistics published in the monograph on Education. (Dewey). Figures for persons employed in manufacture given in the occupation statistics do not accord with those given in the volume on Manufactures. (North).

3. Faults of Method.

a. Certain investigations relating to matters of the greatest interest fail to give adequate results because the

basis of the inquiry is at fault. In this class belong all attempts to secure the annual rate for crime, births, and deaths by direct enumeration at a given time without recourse to registration or other continuous records. (Falkner, Wilbur, Fisher). The inquiry as to months unemployed during the census year is of a similar character. (Mayo–Smith).

b. Questions which cannot be answered, such as degree of intermixture of white and negro blood. (Ripley).

c. The tabulations are in some cases omitted, in some defective, and in some over-elaborated, *e. g.*, relation to head of family (Holmes), language of those who do not speak English (Dewey), nativities of the foreign-born illiterate (Dewey), number of the dependents in relation to those employed (Mayo–Smith).

d. There are certain faults of classification which are found in both schedules and tabulations, *e. g.*, statistics of occupations, especially distribution of "laborers not specified" (Mayo–Smith), classification of the size of farms (Stone), statistics of taxation and wealth (Plehn), municipal receipts and expenditures (Gardner).

4. Faults in the textual analysis of the figures. Analyses which attempt to show cost of production or the relation of capital to product, or an average wage (North, Steuart, Ford, Bullock). Comparisons which disregard the varying sex and age constitution of the different sections of the country and the different elements of the population, *e. g.*, for crime (Falkner), education (Dewey), pauperism (Lindsay), occupations (Mayo–Smith), registration and non-registration areas (Wilbur).

IV. The Committee congratulates itself and the Association upon this noteworthy collection of papers,

the result of the scientific zeal and effort of so many men. It would recommend to the Association the immediate publication of the same as a Monograph,[1] and believes that such publication will bring honor on the Association and will advance science.

RICHMOND MAYO-SMITH,
WALTER F. WILLCOX,
CARROLL D. WRIGHT,
ROLAND P. FALKNER,
DAVIS R. DEWEY,
Committee.

[1] At the meeting of the Association, December 27–29, 1898, to which this report was presented, it was resolved by the Council to print the papers as a Monograph, and in fulfillment of that order the present work is published.

POPULATION.

Area, Population, Birthplace, Migration and Conjugal Condition.

Area.[1]—The area of a country means not the number of square units of surface it actually contains, but the number it would contain if every part lay exactly at the level of the sea with no allowance for elevation or irregularities of surface. The area of any considerable portion of the earth's surface, such as a state or county, is measured not on the earth itself but on a map representing it and hence the accuracy of the measurement depends upon that of the map. Within the United States all degrees of accuracy in surveys and maps may be found from the brilliant results achieved by the Coast and Geodetic Survey to the uncertainty in the location of the boundary lines between Virginia and West Virginia or around Alaska, an uncertainty which leaves ample room for an error of some hundreds of square miles in the former case and of some thousands in the latter. In general it is probably true that the boundaries of the country are located and mapped more accurately than those of the states, and these again more accurately than those of the counties. Hence the confidence to be felt in an official statement of the area of a part of the United States varies with the extent of territory, the larger it is, other things equal, the less the probable margin of error. This country contains no island states but on its borders are eight island counties, two on the Pacific coast, two in the Great Lakes, and

[1]As the writer has treated the subjects of Area, Population, and Density of Population at greater length in recent publications of the Association, he may refer to American Economic Association, *Studies*, :20–257 and 385–455.

four on the Atlantic. Six of these have been measured by a competent expert on the accurate maps of the Coast or Lake Surveys and the results given out by the Census Office in 1890[1] depart from his conclusions by from five to thirty-one per cent. The area of Long Island, including adjoining islands, is given as 1007 square miles, while its true area is within one per cent of 1353.8. It would have been helpful to students if the facts regarding the determination of areas and the degree of confidence to which they are entitled had been mentioned in the publications of the Census Office.

Population.—The population of the earth as a whole is an unambiguous phrase, for it can mean nothing else than the number of people living on the earth. But the phrase, population of a country, demands definition of the word country before it is clear. Country like continent or island may mean a certain part of the earth's land surface or like family or state it may mean an organized group of human beings. In the former sense one may speak of the area of a country but not of the area of a tribe, in the latter sense one may speak of the opinion of a country but not of the opinion of an island. In the phrase, the population of a country, as popularly understood neither of the two meanings is excluded. If country means only a certain portion of land surface, the relation its population would sustain would be merely that of physical presence. If country means also an organization of human beings various other relations may be conceived such as domicile or citizenship. In the former sense of country its population is the number of human beings on it at a certain moment, in the latter sense its population is the number of residents. The latter is the usual popular

[1] Eleventh Census. Bulletin 23.

meaning of population, the former is its technical and scientific meaning, for if a word is to be used for purposes of scientific investigation, it must be susceptible of such definition as to facilitate the inclusion or exclusion of any case that arises. The test of physical presence or absence at a certain moment can be easily and accurately applied, the test of residence is often a puzzle even to the courts and turns largely upon a careful balance of probabilities regarding intent. Hence the trend of European practice has been to define population for census purposes by physical presence, but in this regard American custom follows popular usage and the population of the United States means the number of inhabitants on the census day.

The word population is used in the census volumes in three senses: (1) all the inhabitants of the country; (2) all except those on Indian reservations or in Alaska; (3) the inhabitants of the states alone, excluding also the territories. These are called respectively the total or aggregate population, the general population and the constitutional population. It would increase the value of the twelfth census if the suggestion made in the Eleventh Census[1] could be adopted and the first and second meanings made to coincide by including the people on reservations under the general population.

Probably the best test of the accuracy of a census is its agreement with the results of previous and subsequent counts. Over one-fourth the people of the United States (twenty-seven per cent) have been counted by state authority since 1890 and a comparison of these results shows that the last federal enumeration was probably within one per cent of the truth. I believe that the faults of census legislation and administration have

[1] Population, 1: c.

impaired public confidence in the results here considered more than the facts warrant.

Density of Population.—The density of population means the number of persons to a unit of surface and thus is an abstract measure of the isolation, proximity or crowding of the population. The smaller the divisions of a country for which the area and population are known, the more detailed and fruitful the study of the density of population may be made.

The census authorities might consider the wisdom of ordering in connection with the twelfth census a special study of cities in the United States above a certain limit of size, say 25,000. If this were done a careful determination of the density of population of each as a whole, and where possible by wards, would lead to important results. The effort in that direction made by the eleventh census, the preliminary results of which appeared in Bulletin 100, was apparently not carried to completion and the only inferences that can be drawn from the census volumes regarding the density of population of our cities by wards are to be gathered from a table showing the number of persons to a dwelling in each ward of every city.[1] A dwelling was defined[2] as any building or place of abode in which any person was living. A tenement house was considered one house but a building with a dividing partition wall and separate front doors was two or more dwellings. In New York city there were over eighteen persons to a dwelling while Hoboken had thirteen, Holyoke, Mass., eleven and no other city large or small more than ten. In the cities of the United States there were twenty-eight wards with over fifteen persons to a dwelling. Of the

[1] Eleventh Census. Compendium, 1: 880-897.

[2] Eleventh Census. Instructions to Enumerators, 19.

twenty-four wards in New York, twenty were among these twenty-eight most crowded wards in the country, while of the eight remaining, one was in Brooklyn and two in Hoboken. The fourteen most crowded wards in the country measured by this test are all in New York. If the next census should decide to make a study of the density of population of our cities as wholes or by wards, it might consider the wisdom of deducting from the total area of each city the amount occupied by water surface, parks, streets, etc., thus arriving at the built-up surface. That such an effort if successful would result in very different figures and order of density from that reached by the ordinary method is shown by the following table for ten European cities.[1]

City.	Density per acre of total area.	Density per acre of built-up area.
Genoa	23	378.
Berlin	77	266.
Milan	60	261.
Vienna	53	238.
Venice	98	215.
Paris	118	159.
Florence	16	144.
Turin	62	119.
Hamburg	27	107.
Dresden	31	104.

In the preceding figures the error committed in Bulletin 100 of the eleventh census has been avoided at least for the Italian cities and the built-up area has been compared with the population living upon it and not with the entire population of the city.

Center of Population.—This concept is defined as "the center of gravity of the population of the country

[1] *Journal de la Société de Statistique de Paris*, 25: 486 quoting *Annales de Statistique du Royaume d'Italie*, vol. 9 (1884).

each individual being assumed to have the same weight." It seems open to some objections. Under the definition given the center of the world's population would be a point probably nearer the center than the surface of the earth. Granting that this is not consistent with the explanation made in an earlier census that the country (or earth) is treated as a plane surface, it may still be urged that to regard all individuals as of equal weight and to assume that the influence of each in determining the situation of the center of population increases with his distance from the center involve very questionable postulates. Statistical arguments constantly exaggerate the resemblances between physical and social phenomena. The individual like the atom is counted always as one, never more or less. While individuals differ in physical weight, they vary far more in social influence. A physical body may be controlled by gravity, a population is directed by public opinion. In fixing the center of gravity of a physical mass a unit gains power by remoteness, but in forming the public opinion of a social group a unit loses power by the same fact. If the center of population is to be accepted as an admissible social concept rather than an illegitimate transfer of a physical notion, its definition in my judgment should be changed. The residents of Hawaii or the Philippines should not have increased influence because of their remoteness. To be true to social conditions their influence should be deemed less. But as no measure of this diminution of influence might easily find acceptance, the notion of the *median point* of population might be substituted for that of the center. This is a point such that half the population of the country lies east and half west of its meridian, half north and half south of its parallel. It offers the practical advantage

of being far easier to locate than the center,[1] and also, I believe, the advantage of being nearer the average man's interpretation of the term.

Birthplace.—Before seeking to interpret any census figures, effort should be made to determine the degree of confidence to be placed in them. An error in the statement of birthplace might arise from ignorance or from intention. It is not improbable that among the negroes and the more ignorant native whites an appreciable proportion did not know the state in which they were born. Many immigrants, especially such as came in childhood, may not have known in what country they were born. Other immigrants, who had become Americanized, may have misrepresented the facts deliberately to the enumerators. It has been estimated that the latter personally met about one person in seven. If so, the information regarding the birthplaces of the other six-sevenths must have been derived second hand and hurriedly. Such considerations lead one to conclude that errors in the returns of birthplace may have been common. Can any evidence in favor of or against this possibility be derived from analyzing the figures? Birthplace and birth time are related facts. If one does not know his birth time, and so his age or the ages of the family for which he is answering, it would afford some support for the belief that he may not be accurate in returning birthplace. The degree of inaccuracy in the return of ages may be estimated from the figures themselves. When an age is incorrectly reported, it is likely to appear as a round number, most often a multiple of ten, less often as an odd multiple of five, least often as a multiple of two but not of ten. The evident errors in the table of ages may

[1] In 1890 it was about seventy miles northeast of the center of population and near the western boundary of Ohio in Darke county.

be corrected with more or less success by mathematical processes. A study of the table shows that persons are more apt to misstate their age as they advance in years.[1] Probably the same is true of birthplace. In measuring the tendency in various states and social classes to concentrate on certain years of age I have employed the following method: The entire number of persons between twenty-eight and sixty-two years of age inclusive was found from the age tables. Then it was assumed that the true number of persons who were thirty, thirty-five, forty, forty-five, fifty, fifty-five or sixty years of age would be one-fifth of the former sum. The sum of those actually reported at one of these seven ages was also derived from the tables, and was found uniformly to exceed the true number as computed. The percentage of excess gives an approximate measure of the inaccuracy with which the ages of adults are reported. From such a table it appears that the ages of foreign born whites are reported with about double the inaccuracy prevalent among native whites, and those of negroes with about double the inaccuracy of the white immigrants. Hence it seems probable that statements regarding the birthplace of negroes are to be given less confidence than those regarding the birthplace of whites. In favor of the accuracy of the returns of birthplace of the foreign born it may still be urged that the country of birth is less likely to slip the memory than the year or the state. It may be granted that, other things equal, foreigners report the country of birth more accurately than natives do the state. But this can hardly outweigh the greater ignorance of the foreign population. Foreigners or certain classes of foreigners have a deeper and more widespread prejudice to encounter than that against the

[1] Am. Stat. Assn. *Publications* 5 : 133, (1896).

natives of any American state, and this feeling would create or strengthen the motives for misrepresentation. Some further evidence may be derived from the figures for native and foreign born whites by age and sex. In 1880 among every 10,000 native whites 5,051 were males. In 1890 among every 10,000 native whites ten years of age and over 5,067 were males. The latter class must have been the survivors of the former, and yet the proportion of males has increased by 16 in 10,000. If this were correct it would be due to a higher mortality of females. Assuming that the average number of native whites during the decade was the arithmetic mean between the number in 1880 and the number over ten in 1890, and that the annual number of deaths was one-tenth the decennial decrease, the death rate for males was 10.2 and for females 10.9. It seems doubtful whether such an excess in the female death rate is more probable than the return of a certain number of foreign born males as native. The excess of males in 1880 among the native whites increased in 1890 among the survivors by nearly 75,000. In 1880 there were nearly a quarter of a million more male than female children under fifteen among the native whites. In 1890 the excess between ten and twenty-five had fallen to less than sixty thousand. But in 1880 among the native whites between fifteen and fifty there were only sixty thousand more males than females, while in 1890 the excess of native white males between twenty-five and sixty was a third of a million. If this surprising distribution of the excess be due in an appreciable degree to misstatements of foreign born males, it should be especially apparent in the northern and western states where the foreign born whites are over one-fifth of the

total white population, and of little influence in the southern states, where they are less than one twenty-fifth. Above the age of twenty the proportion of males among the native whites in the northern states is uniformly greater than in the southern states, as the following table shows:

PROPORTION OF MALES IN 1890 AMONG NATIVE WHITES.

Age group.	Males in 10,000. Southern states.	Northern states.	Excess in northern states.
20–24	4981	5003	22
25–29	4984	5070	86
30–34	5142	5163	21
35–44	5125	5167	42
45–54	4944	5095	151
55–64	4987	5160	173
65 +	5032	5021	−11

On the whole it seems probable that a certain number of foreign born residents were reported as natives, that this was more common among males than females either because they were more numerous, less informed, less veracious, or less likely to be seen personally by the enumerators and so to render accurate information. Many a boarding-house keeper must have reported for lodgers whose birthplace was unknown. This tendency to call oneself a native apparently increases with age and the progressive Americanization it involves.

Proportion of Foreign born Population in the United States.—It appears from the following table that no other country in the northern hemisphere has received so large a portion of its population from abroad. The percentage of foreign born in the population of various countries was as follows:

PERCENTAGE OF FOREIGN BORN.

Country.	Date.	Percent of foreign born.
Seven Australasian Colonies	1891	32.6
Uraguay	?	30.0 (?)
Argentine Republic	1895	25.3 (?)
United States	1890	14.8
Canada	1891	13.4
Luxemburg	1890	7.6
Switzerland	1888	6.4
Belgium	1890	2.8
Bulgaria	1888	2.8
France	1891	2.2
Netherlands	1889	1.7
Greece	(1879)	1.6
United Kingdom	(1891)	1.1
Germany	(1890)	1.0
Austria-Hungary	(1890)	.6
Sweden	1890	.5
Spain	1887	.4
Italy	(1881)	.2

The United States have about half the proportion of foreign born found in three countries of the southern hemisphere, about the same proportion as in Canada and about twice the proportion of the European states with most foreigners, viz., Switzerland and the diminutive Grand Duchy of Luxemburg, smaller and less populous than Rhode Island.

Proportion of Native Population in Foreign Countries.—The converse of the number of foreign born in the United States is the number of American born in foreign countries. Our twelfth census might well attempt, as do those of some other countries, to report the number of Americans by birth residing outside the United States, and as an effort in this direction the following table has been compiled mainly from the census reports of foreign countries:

PERSONS OF AMERICAN BIRTH LIVING ABROAD.

Country of Residence.	Date.	Number.
Canada	1891	80,915
United Kingdom	1891	31,412
Germany	1890	17,550
Seven Australasian Colonies	1891	8,139
Austria-Hungary	1890	2,099
Hawaii	1890	1,928
Sweden	1890	1,482
Italy	1881	1,286
India	1891	1,091
Switzerland	1888	986
Chile	1885	924
Japan	1890	899
Belgium	1890	414
Costa Rica	1892	204
Korea	1895	90
Samoa	1895	26
Total		149,445

The two countries not on the list which have probably the greatest number of American born are France and Mexico. In France there were, in 1886, 10,253 persons whose nationality was returned as American North or South. It may be fairly assumed that the number of persons born in the United States and residing in France in 1891 was between five and ten thousand.

The absence of any figures for Mexico reduces one to an estimate. For this purpose I have assumed that the Americans in Mexico bear the same proportion to the Mexicans in the United States that the Americans in Canada do to the Canadians in the United States. This gives the proportion: 980,938 Canadians in the United States are to 80,915 Americans in Canada as 77,853 Mexicans in the United States are to the estimated number of Americans in Mexico, which is thus found to be 6,442. If this should be deemed too small an estimate, attention may be called to the barriers of lan-

guage and of a lower standard of life for the working classes south of the Rio Grande, and also to the fact that in all the eighteen counties along our Mexican frontier, from which emigration would mainly go out, there are fewer than one hundred thousand (97,183) natives of the United States, and over one-fourth of them (25,577) are in southern California, where the motives for crossing the Mexican frontier must be weak. On the whole it seems probable that the natives of the United States who have emigrated to foreign countries are between 165,000 and 175,000, and I will assume the number of 170,000.[1] To find the proportion this constitutes of our total native population the number of natives living in the country must be known. The census, which reports 53,372,703, does not include the persons in Indian territory or Alaska, or on reservations. One may assume that all Indians and the negroes of Indian territory are natives. Of the persons of other races living with Indians on reservations 98 per cent are in Indian territory or Oklahoma, and may most fairly be compared with the white population of Texas, where 91.3 per cent are native. Hence to the number just given the following may be added:

Indians on reservations or in Indian territory	187,447
Negroes in Indian territory	18,636
91.3 per cent of the remaining 117,381 residents of Indian territory or reservations	107,200
Natives in Alaska	15,389
Total additions	330,672
Natives returned by census	53,372,703
Natives abroad	170,000
Total natives of United States	53,873,375
Percent. of total natives who have emigrated	.32

[1] The 18,000 "Americans" mentioned in Liberia must be mainly African born descendants of emigrants.

This table shows that only about one in three hundred natives of the United States has emigrated, while as seen before more than one in seven of the resident population is an immigrant. Probably no country has so large a proportion of immigrants and at the same time so small a proportion of emigrants as the United States.

No direct and conclusive information upon this point for Argentine Republic and Uraguay is obtainable, but it may be noted that in twenty-one years, 1873–1893, the emigrants from the Argentine Republic were over half a million and more than one-third of the immigrants, while in Uraguay the emigrants for the six years, 1884–90, were nearly three-fifths as many as the immigrants.[1]

In the case of natives of the seven Australasian colonies the Scotch census of 1891 reports the number found in Scotland, but similar information is lacking in the English and Irish censuses. On the assumption that in England and Ireland the ratio of natives of Australasia to all natives of British colonies and India was the same as it was in Scotland,[2] there were over twenty thousand natives of Australasia in the United Kingdom, two-thirds as many as the natives of the United States there. Taking into account the enormous difference in the number of natives of the two regions the return current from Australasia to the United Kingdom is about fourteen times as strong as the return current from the United States to the mother country.

Of the total number of natives of Canada in Canada

[1] 72,704 emigrants and 126,391 immigrants.

[2] Natives of Australasia in Scotland (1891), 2,063. Natives of all British colonies, including India, in Scotland, 13,607; in England and Wales, 111,627; in Ireland, 8,430. Estimated natives of Australasia in United Kingdom. 20.265. Number in India, 845; in United States, 5,984; in Australasia, 2,561,865. Minimum percentage abroad, 1.0.

and the United States nearly nineteen per cent are in this country. It seems clear, therefore, that when both immigration and emigration are considered the United States has gained more and lost less population than any other country.

A study of the table giving the natives of the United States abroad shows that probably no country in Europe or Asia has received from this country a larger immigration than it has contributed. The same is true of Africa except for Liberia, which may be regarded as a localization of the return current attendant upon all strong currents of migration. The adjacent countries of this continent have also sent hither many more natives than they have received in return. Lack of data makes a comparison for the West Indies, and Central and South America impossible, but it is not unlikely that in every important case, except possibly the Argentine Republic and Uraguay, the northward current has been the stronger. In fact the only direction in which the United States has sent a demonstrably stronger current of migration than it has attracted has been over the Pacific to Hawaii and the Australasian colonies.

From scattered data relative to earlier foreign censuses it seems probable that the emigrants from the United States increased during the last decade more slowly than the native population.

Foreign born in American cities.—The high proportion of foreigners in the urban population of the United States is deemed by the census proof of a tendency to cling to the cities. Thus it is said: "If the proportion of the foreign born in the principal cities is contrasted with the proportion of the foreign born in the country at large, a very fair measure is obtained of their appetency for urban life" and "the element of foreign birth

seeks the cities with far greater avidity than does the element of native birth."[1] But it appears that "of all the nationalities considered, the Mexicans showed the least appetency for urban life."[2]

The last statement suggests that the difference may be in the circumstances rather than the people. Natives enter the United States by birth and this occurs mainly in the country, foreigners enter it by migration and this occurs mainly at the city ports. While the feebleness of infancy is a barrier to the migration cityward of the former, ignorance of the language and customs of the country confine the great majority of foreigners for a time to some colony of their countrymen in a great city. Dispersion of either element from the place of arrival is a gradual process and is likely to be overlooked, but such a dispersion of the foreign born from our cities is in rapid progress. The increase of foreign born in the country during the last decade was 2,570,000, a number that measures the excess of the influx over the losses by death or emigration. Nearly all entered our cities and were added at the start to our urban population. In 1880 the foreign born population of our fifty largest cities was 2,330,000 and of the rest of the country 4,350,000. Assuming that all immigrants came to these cities and stayed there, the number in them in 1890 would have been 2,330,000 plus 2,570,000 or 4,900,000 plus the number of deaths among the foreign born immigrants elsewhere in the country. If there were any current out from the cities, it must have resulted first in supplying the losses from death among the rural foreign born and then in increasing the number, while its effect in the cities would appear in a decreased number of foreigners. Just these

[1]Eleventh Census, Population, 1:lxxxix.

[2]*Ibid.*, cli.

results appear. Instead of more than 4,900,000 foreign born in these fifty cities in 1890 there were only 3,441,000. Instead of less than 4,350,000 in the rest of the country there were 5,808,000. While the additions were in the first instance to the cities and the substractions of death were evenly distributed, the adjustment went on so rapidly that foreigners outside these cities increased 34 per cent and within them only 48 per cent. This would seem to indicate that the proportion in our large cities was increasing faster than elsewhere, but it must be remembered that these cities have had a very rapid growth, of which the arrival and stay of immigrants have been only one aspect. These cities gained in population 43.5 per cent during the decade and the rest of the country only 21 per cent. Hence relatively to population the smaller cities and rural districts of the country gained in foreign born population faster than the great cities; and the eleventh census when properly interpreted affords no evidence that between 1880 and 1890 the immigrant population as a whole remained stagnating in our great cities. The following table gives the figures for the fifty largest cities in 1880 and the same cities in 1890.

FIFTY LARGEST CITIES.

	Total Population.	Foreign born.	Percent. Foreign born.
1880	7,793,903	2,330,374	29.90
1890	11,184,031	3,441,165	30.77
Per cent of increase	43.5	47.7	.87
REST OF COUNTRY.			
1880	42,361,880	4,349,596	10.27
1890	51,438,219	5,808,382	11.29
Per cent of increase	21.4	33.5	1.02

Wide as the difference between city and country is in

the proportion of foreign born and much as the unparalleled immigration to our ports between 1880 and 1890 tended to increase it, still the percentage of foreign born has increased more rapidly in the cities of less than 56,000 people and the towns and country districts than it has in the great cities.

Interstate Migration.—Enormous as the influx of foreign born into the United States has been, the movement of the native population from state to state is even greater. The number living in another than their native state is nearly one-fourth greater than the number of foreigners in the country, and when these numbers are compared with the populations giving rise to them, the high mobility of the American population becomes yet more apparent. A study of these internal migrations is rendered difficult by the complexity of the census table.[1] This gives the natives of each of fifty-one territorial divisions residing at the time of the census in each of forty-nine divisions. A table with twenty-five hundred entries is too detailed to be intelligible. For a survey of the subject I have treated the country as composed of the five groups of states recognized by the census. The results appear in the following tables:

NATIVES OF NORTH ATLANTIC STATES.

Place of Residence.	Number in 1880.	Number in 1890.	Increase (+) or Decrease (—). Absolute.	Per cent.
North Atlantic group	11,412,303	13,005,694	+1,593,391	+13.0
South Atlantic group	125,018	141,826	+ 16,808	+13.5
North Central group	1,684,774	1,550,668	— 134,106	— 8.0
South Central group	59,333	68,766	+ 9,433	+15.9
Western group	205,728	308,455	+ 102,727	+49.9
United States	13,487,156	15,075,409	1,588,253	+11.8

The preceding table shows that the natives of the

[1] Eleventh Census, Population, 1: 560–563.

North Atlantic group who were living within that region in 1890 had increased in a decade more than the entire increase in the country. It follows that the absolute number of emigrants fell. But, as the table shows, this fall was consistent with a growth of migration to three of the four other sections of the country. The rate of increase in the number in the southern states was about as rapid as the increase at home. In 1880 the North Atlantic group retained within its limits 84.6 per cent of its natives, while in 1890 the percentage had risen to 86.3.

NATIVES OF SOUTH ATLANTIC STATES.

Place of Residence.	Number in 1880.	Number in 1890.	Increase (+) or Decrease (—). Absolute.	Per cent.
North Atlantic group	156,467	207,010	+ 50,543	+32.3
South Atlantic group	7,173,979	8,325,844	+1,151,845	+16.1
North Central group	388,560	355,454	— 33,106	— 8.5
South Central group	758,271	674.942	— 83,329	—11.0
Western group	32,437	53,642	+ 21,205	+65.4
United States	8,509,714	9,616,872	+1,107,158	+13.0

This table shows that the natives of the South Atlantic states, also, during the last decade manifested a weaker tendency to migrate. Notwithstanding their total increase of over a million in the country the number in the central states north and south was less in 1890 by considerably above one hundred thousand. On the other hand the overflow from this group to the North Atlantic and Western states increased by over seventy thousand. The increase in the current to the North Atlantic states was remarkable, that region having received by 1890 sixty-five thousand more than it returned, while in 1880 it had received only thirty-one thousand more.

NATIVES OF NORTH CENTRAL STATES.

Place of Residence.	Number in 1880.	Number in 1890.	Increase (+) or Decrease (—). Absolute	Per cent.
North Atlantic group	101,879	138,419	+ 36,540	+35.9
South Atlantic group	48,310	67,897	+ 19,587	+40.5
North Central group	11,807,697	15,685,746	+3,878,049	+32.8
South Central group	241,129	357,105	+ 115,976	+48.1
Western group	257,144	609,398	+ 352,254	+137.0
United States	12,456,159	16,858,565	4,402,406	+35.4

When one considers the very rapid increase in the natives of this group of states, it is not surprising to find that the number of them in each of the other divisions has risen during the decade. The unexpected result of the preceding table is the proof it affords that emigration from the North Central states to each other group has grown at a higher rate than the total native population of the group. The net gain of the North Central group from the North Atlantic fell in ten years from 1,583,000 in 1880 to 1,412,000 in 1890, or over ten per cent. Similarly the net gain from the South Atlantic states fell from 340,000 to 288,000, or fifteen per cent, and the net gain from the South Central group fell from 310,000 to 195,000, or thirty-seven per cent, while the net loss to the Western group increased from 243,000 to 585,000.

NATIVES OF SOUTH CENTRAL STATES.

Place of Residence.	Numbers in 1880.	Numbers in 1890.	Increase (+) or Decrease (—). Absolute.	Per cent
North Atlantic group	16,066	20,963	+ 4,897	+30.5
South Atlantic group	74,593	88,194	+ 13,601	+18.2
North Central group	551,715	552,193	+ 478	+ .1
South Central group	7,583,235	9,465,322	+1,881,087	+24.8
Western group	52,049	94,166	+ 42,117	+80.9
United States	8,277,658	10,220,838	+1,943,180	+23.5

This group, like the two Atlantic divisions, is characterized by a decreasing mobility of population. The

increase of natives remaining within the group has been a little faster than their total increase anywhere within the country. But in this case migration to the North Atlantic and Western states has grown faster than the return current to the South Atlantic group, while the current north has just filled the gaps left by death.

NATIVES OF WESTERN STATES AND TERRITORIES.

Place of Residence.	Numbers in 1880.	Numbers in 1890.	Increase (+) or Decrease (—). Absolute.	Increase (+) or Decrease (—). Percent.
North Atlantic group	6,086	9,231	+ 3,145	+51.7
South Atlantic group	1,008	1,951	+ 943	+93.5
North Central group	14,465	24,684	+ 10,219	+70.6
South Central group	3,079	5,855	+ 2,776	+90.1
Western group	720,224	1,152,636	+ 432,412	+60.0
United States	744,862	1,194,357	+ 449,495	+60.4

In the Western as in the North Central states the mobility of the native population has not fallen. The very small return current to the southern states had nearly doubled during the decade, while the much more important one to the North Central states has outstripped decidedly that of the natives of the group. The low average age of the natives of this group makes the result the more noteworthy.

From the data in the preceding tables the proportion of the natives of each group in the country who were living without the group in 1880 and 1890 may be computed.

Group.	Percent. of natives living outside in 1880.	Percent. of natives living outside in 1890.
North Atlantic	15.4	13.7
South Atlantic	15.7	13.4
South Central	8.4	7.4
North Central	5.2	7.0
Western	3.3	3.5

It seems that the difference between the groups is

diminishing, long distance migration from the Atlantic and Gulf states falling off, while that from the interior and Pacific states is growing.

The following table prepared from the figures of the preceding shows the changes of migration in the groups:

Group.	Percent of total Natives of Groups residing in state of birth.	some other state of group.	outside group.	Total.
North Atlantic—				
1880	76.8	7.8	15.4	100.
1890	78.5	7.8	13.7	100.
South Atlantic—				
1880	78.2	6.1	15.7	100.
1890	81.1	5.5	13.5	100.
North Central—				
1880	76.9	17.9	5.2	100.
1890	75.8	17.2	7.0	100.
South Central—				
1880	80.1	11.5	8.4	100.
1890	82.3	10.3	7.4	100.
Western—				
1880	88.5	8.1	3.4	100.
1890	86.9	9.6	3.4	100.

Natives of the Western states and next to them of the Southern states remain in greatest proportion in the state of birth, while in the interior they leave the state most frequently. In the Central and Western states the more common form of migration has been within the group, while along the Atlantic it has been to some state beyond.

Conjugal condition.—Conjugal condition means the relation of the population to the social institution of marriage. At the date of the census each person in the country was either married or not married. The not married either had never been married or had been but were no longer. The marriages of the last class must have ended either by death of the other party to the

marriage or by the dissolution of the union through a legal divorce. From the point of view of conjugal condition, therefore, the population falls into four and only four classes: (1) married, (2) single, (3) widowed, (4) divorced.

The question whether at a given time A and B were married is often difficult for a court to determine and in not a few instances the persons themselves must be mistaken about the facts. This would be true more often of the third persons by whom the information was sometimes furnished. In this subject ignorance is thus a source of some error, but probably a less important source than conscious misrepresentation. Motives to misrepresent would often affect the two sexes in opposite directions tempting the mother of an illegitimate child to report herself as married and the husband who has abandoned his wife to call himself single. It is probably for this reason in part that most censuses report the married women outnumbering married men. Thus in the United States among the persons of negro descent there were 12,181 more married women than men. It is not likely that many of these were married to white men. The large majority, I believe, is explicable as incorrect returns. The motives to call one's self single or married when one is divorced would probably appeal to a large proportion of all persons divorced and I doubt that any serious reliance should be placed upon the returns of divorced persons. There were probably not far from twenty-nine thousand divorces granted in the United States in 1890. It is not likely that divorced persons would remarry so rapidly that the actual number at any day, *e. g.*, June 1, 1890, would be only 2.3 times the number of persons annually divorced. The number of divorced persons re-

ported by a census is a function of two variables, the actual number of such persons and their average veracity, and the latter is so important that we have hardly any warrant for inferences from the reported to the actual number. The proportion of divorced persons in cities is not less than in the country at large as the census declares,[1] but for obvious reasons veracity on such topics in cities is less general. Still as persons have no ground to return themselves as divorced unless they think themselves so, the number of divorced persons returned may be regarded as a minimum limit to the true number. With these qualifications the returns of conjugal condition may be accepted as substantially correct.

As the conjugal condition of the population of the United States was not reported prior to 1890 comparison with earlier national censuses is impossible and one is compelled to rely upon state censuses. These show that the proportion of the total population which is married has tended to increase except in Massachusetts and Rhode Island.

PERCENTAGE OF TOTAL POPULATION WHO WERE MARRIED.

Year.	Iowa.	Mass.	Mich.*	New York.	Rhode Isl.
1855	?	?	34.1	36.1	?
1865	?	?	36.2	37.5	?
1875	?	39.1	38.9	37.8	38.5
1885	36.5	38.1	40.4	?	37.7
1890	36.6	37.7	40.0	38.4	37.5
1895	37.2	37.7	40.3	?	?

* The state census of Michigan is taken four years after the national census *i. e.*, 1854, 1864, etc.

While no clear results appear from the table, yet in the two states of New York and Michigan in which the figures extend over about twice the period of the other states, the tendency has been towards an increase in the

[1] Eleventh Census Population I : clxxxvii.

proportion of married persons in the total population. Probably the majority of states have changed in the same direction during the period.

The increase in the proportion of married persons may be due solely to an increase in the adult and marriageable population. Thus the percentage of married persons in the population over fifteen of New York state was:

1855	56.3
1865	58.3
1875	56.1
1890	54.0

Down to 1884 the Michigan census did not return the population above fifteen. In Massachusetts the percentage of adults who were married was in 1875, 55.3; in 1885, 52.6; in 1890, 51.2; in 1895, 51.3, a decrease of four per cent in twenty years. From the scattered evidence available it seems probable that the proportion of adults who are married is decreasing.

In foreign countries the proportion of the population who are married ranges from a minimum of about one-fourth to a maximum of nearly one-half. Disregarding India, as not making a part of occidental civilization, the foreign countries and American states with lowest and highest proportion of married in their population were:

	Percent. married.		Percent. married.
Ireland	26.4	Arizona	30.7
Scotland	29.7	Virginia	31.1
Bulgaria	42.0	New Hampshire	41.8
Roumania	42.3	Vermont	42.1

In the United States there are two main regions in which the percentage of married to the total population is below the average of the country, 35.7. The first includes all the old slave states, the second all the states in the western division except New Mexico. The reason

for the small proportion in the southern states is the large number of children there, but in the western states a stronger influence is the relative fewness of women. Comparatively little is to be learned from a study of conjugal condition, therefore, which does not eliminate or allow for these differences in age groups or sex distribution.

The usual method of determining the conjugal condition of the adult population is to compare the married persons over fifteen with the total population over fifteen, and this limit of age is preferable to that of twenty, employed by the census, both because it facilitates comparison with other countries and because it seems unwise to fix the age of adult life for this purpose at twenty, when there are over 330,000 married persons under that age in the country. Hence in this paper the limit of fifteen years has been employed to separate the marriageables from the unmarriageables. In our various states and territories the proportion of adults who are married falls between two-fifths and three-fifths of the population, or more accurately between 41.8 per cent in Montana and 61.5 per cent in Oklahoma. The average for the country is 55.3 per cent. There are two main regions in which the proportion of married persons is below the average, the more extensive but less populous area includes all the western division except New Mexico, the second embraces all the Atlantic states from Massachusetts to North Carolina, except New Jersey and West Virginia. As in the east women are in excess among the adult population, and in the far west men are much more in excess, it may be that a primary cause of a low proportion of married persons is found in this dissociation of the sexes. To test the hypothesis the proportion

of males in the adult population of each state has been found and the states divided into three groups, those having over six-tenths of the adult population male, those having between five-tenths and six-tenths male and those having less than five-tenths male. The first class includes all the western division except Utah and New Mexico, and corresponds closely to one great division of states with low proportion of married persons. The third class includes all the states touching the Atlantic from New Hampshire to Louisiana except Delaware, Florida and Mississippi. It shows a general agreement with the other main region of low proportion of married persons, and the hypothesis that a main cause of few marriages lies in dissociation of the sexes by interstate migration is confirmed. It is better, therefore, to study the conjugal condition of each sex by itself.

The returns of the last census make it possible to study the distribution of early marriages for each sex by an analysis of the proportion of persons 15–20 or 20–25 who are married. As the number of married men or boys under 20 is less than 17,000 one must begin for males with the next later age group, 20–25. The percentage of men of this age who are married varies from 6.2 in Montana and 7.0 in Wyoming to 35.0 in Mississippi and 36.9 in South Carolina. The average for the country was 18.9, *i. e.*, nearly one man in five between 20 and 25 years of age is married. The position of the two states with the largest proportion of negroes suggests that early marriages may be more common among men of that race. To test the hypothesis the proportion married has been computed for each race separately. The results for the six states with largest proportion of young married men are as follows :

State.	Married men in each 100 between 20 and 25 years of age. Whites.	Negroes.
South Carolina	25.6	44.6
Mississippi	24.6	42.0
Alabama	29.3	39.5
Georgia	28.0	38.7
Louisiana	22.5	41.5
Arkansas	29.1	36.8

Negro males therefore are unusually likely to marry early.

It is noteworthy that the proportions of married in the two races do not vary together. If numerous early marriages of males be an evidence of widespread ability to live at the standards the people set themselves, the negroes are most prosperous in South Carolina, Mississippi and Louisiana, the whites in Alabama, Arkansas and Georgia. It is also true that the proportion of married men among the whites alone in these six states is far higher than the average for the country as a whole, or for any northern state. Hence southern whites marry in large numbers unusually early.

Early marriages of men are most common in the southeastern states from South Carolina to Louisiana, and least common in the northwestern states from Minnesota to California. But marriages of girls under twenty are most common in the southwest along the Mexican frontier and least common in the northeast from Massachusetts to Maryland. In the United States as a whole about one girl in ten (9.5 per cent) between 15 and 20 is married, but in Massachusetts the proportion is 1 in 25, in New Mexico and Arizona about 1 in 4.

As early marriages of males among southern negroes are far more prevalent than with the whites, one would naturally expect it to be true also that negro girls under

twenty are more usually married than white girls of the southern states. The following table has been prepared for the six states in which early marriages of men were most common:

State.	Married girls in each 100 between 15 and 20 years of age.	
	Whites.	Negroes.
South Carolina	13.0	16.9
Mississippi	13.0	17.7
Alabama	15.1	14.9
Georgia	14.9	17.6
Louisiana	13.0	17.8
Arkansas	20 6	21.5

Early marriages are somewhat more common among negro girls in each of the states except Alabama, but the difference is far less than that between the males of the two races. Even among the whites early marriages are more common than in any of the northern states except those of the far northwest, where the scarcity of women makes their early marriage more general.

The tendency to early marriage on the part of both sexes is thus decidedly greater in the southern states than in the northern. This tendency affects both whites and negroes. Its effects are modified by the unequal distribution of the sexes. Early marriages of men are most common in the south-east because an excess of women is found there to choose from. Early marriages of women are most common in the south-west because of the excess of possible suitors. Early marriages of women are least common in the north-east because of the deficiency of possible suitors, and early marriages of men are least common in the north-west because of the inability of many to find wives. Doubtless these statements are subject to modification. The Spanish American element along the Mexican frontier probably marries unusually early and the opportunities

in the north-east for women to earn wages may induce many to postpone marriage. Yet the general conclusions of the study are not thereby invalidated.

The census figures make it possible, also, to determine how large a proportion of those who attain a ripe maturity of years have never been married.

Among the males between 55 and 65 the smallest proportion of bachelors is found in the southern states of Arkansas, Alabama and Georgia in which 96 out of every 100 of that age are or have been married. On the other hand in the mining states of the far west less than 75 per cent of the old men have ever been married and in Nevada the percentage is as low as 62. The small proportion of elderly bachelors in the south may be due to the negroes. A study of the facts by race, however, shows that among the white men of Georgia, Alabama and Arkansas it is less common to pass through life unmarried than it is anywhere except among the negroes of those and perhaps a few other states.

Elderly unmarried women are least numerous in the predominantly agricultural states of the far west from the Dakotas to Texas and in the Mormon regions of Utah and Idaho. In those states only one woman in twenty-five living at the age of 55–65 is still single, in Utah only one in seventy, and in Oklahoma one in ninety. Along the Atlantic coast from New Hampshire to the Carolinas, especially in Rhode Island and North Carolina, permanent spinsterhood is thrice as common, and in the two states named one elderly woman in every ten is still single. The dissociation of the sexes is probably the main cause of the difference, but mining and perhaps also industrial pursuits seem to be less favorable to marriage than agriculture.

WALTER F. WILLCOX.

Considering the vast number of persons concerned, and the multitude of economic and social issues involved, it is curious that the colored population of African descent in the United States should have excited so little interest among purely scientific observers. From the Civil War down to 1890 scarcely a single work of note upon the American negro can be mentioned, conducted upon modern scientific principles, and unbiased by political, social or religious prejudice. The negro has long attracted the attention of philanthrophists and well-meaning humanitarians; but neither the economist, the physician, nor the authropologist seems to have been alive to the possibilities for research offered by this great population of seven million negroes; nor, on the other hand, have our statesmen appreciated the necessity of accumulating a fund of reliable information from skilled observers, to be used as a basis for legislation. A problem economic, social, and moral, second in magnitude to none in the United States is awaiting consideration; yet the Indians, less than three hundred thousand in number, have attracted in our later censuses far more attention than the negro. Fortunately the last few years have witnessed a revival of interest in this direction, which has already produced noteworthy results. The Federal Department of Labor, for example, has recently inaugurated most auspiciously a series of special investigations;[1] and the Department of Agricul-

[1] The Negroes of Farmville, Virginia: a Social Study; by W. E. B. DuBois. U. S. Dep't of Labor, *Bulletin*, No. 14, 1898, p. 1–38.

ture has already published one report at least upon the subject.[1] The monograph by F. L. Hoffman, a professional statistician of high repute,[2] is also deserving of mention. These, together with a number of special investigations, to which I shall refer, especially those inspired by the Trustees of Atlanta University and the Tuskegee Institute, should also be noted. More important than all these, however, in urging the importance of a comprehensive and scientific treatment of the varied questions concerning the negro in our next federal census, is the recent acquisition of Porto Rico, together with our interests in Cuba and the Philippine Islands. By the events of the late Spanish war, we are likely to add several millions to the number of our colored population.

The first question of importance concerns the actual number of negroes in the United States, irrespective of their geographical distribution or migration; those matters we shall reserve for treatment by themselves. No especial change in the method of enumeration seems to be called for, by the experience of the eleventh census. The results obtained in 1890 when compared with those of 1880, as is well known, firmly established the incompleteness of the returns in the census immediately following the Civil War. The fears excited by an apparent increase of negroes in the United States in the decade from 1870 to 1880 of 34.9 per cent, as compared with a growth of the white population of only 29.2 per cent, were allayed by the total yielded in 1890. This proved

[1] U. S. Dep't of Agriculture. Office of Experiment Stations. *Bulletin*, No. 38. Dietary Studies with reference to the Food of the Negro in Alabama.

[2] American Economic Association. *Publications* xi, Nos. 1–3 (1896). Race Traits and Tendencies of the American Negro.

at once that the defective enumeration in 1870, estimated by General Walker to be not less than three hundred thousand, was responsible for the error.[1] The colored population of African descent manifested in 1890 an increase of but 13.5 per cent; or just about one-half that of the whites for the entire country. Even in its most favorable section, in the southern states, its rate of increase was 10 per cent less than that of the whites. Its relative proportion of the aggregate population decreased in the same measure. In two states only—Mississippi and Arkansas—was any increase in the proportion of negroes, compared with white, apparent. The whole problem of the American negro at once assumed a new aspect. Not an inundation of blacks was threatened for the future; but so alarming a decrease in the relative growth of the negro population as to suggest its ultimate extinction. Attempted explanations for this phenomenon of retrogression will concern us in a later paragraph.

Scarcely less important than the total enumeration by states and territories are the facts of geographical distribution of the negro population, and its present tendencies towards migration. It is of profound importance for the future amelioration of the economic and social status of the negro to ascertain whether the black population is massing by degrees in the Gulf states, or is tending gradually to become disseminated throughout the entire country. In the first case, a cure for any evils in the economic, educational or social situation, must probably be applied by direct Federal interference; whereas, if the burden of the negro population is to be distributed,

[1] A lucid discussion of this by General Walker will be found in Statistics of the Colored Race in the United States, in Am. Stat. Assn. *Publications* 2:91 (1890).

there is greater likelihood that the several states may be able to deal with it adequately by themselves.

No especial change in the census methods seems to be necessary in order to make the migratory tendencies of the negro clear. The censuses in 1880 and 1890 both include a statement of the state or territory of birth and residence of each individual. As Prof. Willcox has suggested,[1] the failure to include a column for "Born in U. S.; state not specified," in 1880 renders a direct comparison of the results for the two censuses somewhat untrustworthy; but if the methods of 1890 be preserved, in 1900 this objection will not apply to a comparison instituted for the present decade. With especial attention directed to accuracy and fullness in collecting information regarding birthplace, the present tendencies in the matter of migration ought to be made clear without any serious modification of the schedules previously employed.

A word as to this tendency as it appears to-day. The widely prevalent opinion, supported by General Walker,[2] by the director of the eleventh census,[3] by Mr. Gannett,[4] and other eminent authorities, is that the negro population in the United States not only tends to increase most rapidly in the extreme southern states, but also that a general movement toward that centre is apparent all through the south. This opinion has been very ably contested by F. J. Brown, esq., of Baltimore, in an admirable paper, which presents a most

[1] Am. Stat. Assn. *Publications* 5 : 371 (1897). See also further discussion, Idem., 6 : 46.

[2] *Forum*. July, 1891.

[3] Eleventh Census. *Bulletin*, No. 48, and elsewhere. *Cf.* Brown *op. cit.*

[4] Statistics of the Negroes in the United States. Baltimore, 1894.

careful analysis of the subject.[1] He distinguishes three belts of negro population, differing in the degree as well as the character of their migratory proclivities. In the "border states," Delaware, Maryland, the District of Columbia, the Virginias, Kentucky and Missouri, the decade, 1880–90, showed a rate of increase of the negro population of only 2.6 per cent as compared with an increase of 20 per cent for whites. In this belt the negroes formed only 19 per cent of the population. Next above these in relative density of negroes came North Carolina and Tennesse with 31 per cent of blacks. In these two states, the negroes increased in numbers by only 6.1 per cent from 1880 to 1890; while in the "far south," where the negroes form almost half the entire population, the rate of increase from 1880 to 1890 was as high as 18.4 per cent. Even this, however, it should be noted, was less than the rate of increase for the negro population in the northern states, which was 20.6 per cent. The most obvious explanation for these facts, and it seems probably the justifiable one, is that not one but two opposite migratory tendencies are really operative to-day. One, and perhaps the larger one, is toward the south and southwest; but its influence is not felt much beyond North Carolina and Tennessee. The other is distinctly northward, due to the superior economic and social advantages offered north of Mason and Dixon's line. This tends to deplete the entire group of Border states; and also to draw from the next succeeding tier to the south. Thus North Carolina and Tennessee lie between two centres of attraction; the nearly stationary condition of their black population shown by the statistics above is the result. Other interesting

[1] The Northward Movement of the Colored Population. A Statistical Study. Baltimore, 1897.

deductions are made by Mr. Brown from examination of the census tables. We have space here only to mention them. He calls attention to the violent contrasts in density of negro population in contiguous counties of the same state; showing how the attitude of the whites often operates to deter a diffusion of the negroes from regions of relative density to those where scarcely any blacks reside. He shows that the regions of greatest negro density are almost invariably those which are backward in increase of population, partly as a result of the economic dependence of the negro upon the white population as employers.

In his description of the character of localities, which seem to be by nature unfitted for the residence of the white population, and in which the negro is bound to predominate in numbers in the future, this author sets a most admirable example which the geographers of the next census would do well to follow. It is high time that population, if it is to be treated from the geographical point of view, should be analyzed by districts possessing distinct individuality of soil, climate, or altitude. The worthless generalizations of the distribution of negro population by "altitude," by "latitude," and by "rainfall," should be rejected at once in favor of descriptions of true "areas of characterization." The environment is not composed of any one of these factors by itself alone, and to analyze population in accordance with them singly is a waste of time and money. Only when considered in combination, soil and climate together, is any real human relation brought into relief. It is greatly to be hoped that the geographers of the twelfth census will at last awaken to the necessity of descriptions of environment, if any be needed, in detail;

and not indulge in glittering generalizations devoid of human or scientific interest.

Can the twelfth census deal in its schedules with the question of blood intermixture of white and negro population? The future of the race will largely depend upon whether it is held aloof from intermarriage, or is gradually assimilated in blood with the white race. Massing in the far south is certainly unfavorable to the latter; dissemination through the white population would be favorable to it. Our former censuses have expended much effort in an honest attempt to elucidate the matter. The Act of March 1, 1889, under which the eleventh census was taken, directed a classification of population as blacks, mulattoes, quadroons and octoroons. Inquiry of this kind naturally has always yielded worthless results. Even were no question of illegitimacy or of ignoble origin involved, as it obviously is in nine cases out of ten, such a query is often impossible of exact answer. To go back over three generations of ancestry is a severe tax upon the genealogical resources of the average southern negro family. I, personally, confess to a lamentable mental obscurity in the matter of what constitutes a quadroon or octoroon. It is as difficult as to distinguish the several degrees of cousins to which human kind is liable. This matter must be approached, if at all, by means of special intensive investigations at the hands of skilled observers. We cannot share the hope of the director of the eleventh census, that even the confessedly imperfect results along this line in 1890, will be of value, when compared with equally imperfect ones for 1900. That two absolutely unreliable collections of data are worth any more than one, is a perversion of statistical principles. Rejection of this inquiry will

greatly simplify the work of enumerators in the field; it will allay popular prejudice in many quarters, and it will leave space for other questions of vital importance and of a more practical nature.

The eleventh census has sufficiently emphasized the *fact* that our colored population of African descent is increasing far less rapidly than the whites. This is true not only in the northern and middle states, so far as can be determined after elimination of the influence of migration; but it holds good all over the south as well. In every part of the United States there can be no doubt that the negro is being outstripped numerically by the white race. In the analysis of the *causes* of this phenomenon, a great opportunity is offered to the director of the census of 1900 to perform a service for humanity and science. It is a difficult question, involving not only the vitality of the blacks of pure blood, but especially the influence of miscegenation upon the half-breeds. Hoffman has carefully gathered and collated such data as were obtainable; and this portion of his monograph dealing with vital statistics is in many respects the most satisfactory. But his conclusions are invalidated for general application to the whole colored population by an important fact. His vital statistics are almost entirely drawn from urban sources; the country negro, forming the overwhelming proportion of the race, is scarcely considered. No available data, in fact, exist. It is highly improbable, therefore, that the alarming degenerative tendencies noted by him can be considered as characteristic of the race as a whole. Despite the present tendencies city-ward, the great proportion of our negroes in the south form a distinctly rural population. The "black belt," which has the greatest density,

is, indeed, almost devoid of cities of any considerable size. And it is precisely this rural negro population of which we have the least knowledge, yet whose present condition may be considered most typical for the race as a whole.

To discover the causes of the present low rate of increase in our negro population, especially in the rural parts of the south, seems to me a most important matter, imperatively demanding the attention of the authorities who take the next census. A special report, similar to that prepared by Dr. Billings in 1890 on the Vital Statistics of the Jews,[1] would be of inestimable value. Yet it should be far more considerable in size and scope. It should proceed more on the lines of the special reports recently started by the Department of Labor; or on the plan of the elaborate special reports on the Indians in the last census. If less than three hundred thousand aborigines are deserving of those detailed special investigations, which form so considerable a part of the eleventh census; surely our negroes, numbering perhaps eight or nine million, are worthy of equally detailed consideration. It will be objected, perhaps, that such an investigation belongs rather to the work of the several state boards of health. In some ways, it is true, they might be better fitted to cope with the complexities of the situation, especially because of their permanency. But, on the other hand, three powerful arguments are in favor of the assumption of this work by the Federal authorities. In the first place, the commonwealths show no disposition to deal with the question thoroughly; secondly, the real significance of the negro problem can only be treated with the entire south and north in view

[1] Eleventh Census. *Bulletin*, 19.

at one time, all sections being subjected to examination under a uniform system; and thirdly, most important of all, the real problem of the demography of our colored race can only be solved by an examination of their economic, moral and physical status combined. Thus, for example, it seems to me far more probable that Dr. DuBois is right in ascribing the relatively slow rate of increase of the average negro family to the fact that it is economically on the up-grade,[1] than to accept Hoffman's explanation that hybridity, vice and ignorance are accountable for it. True, Hoffman discovers a terrific death rate among his city-bred or migrated negroes, but neither DuBois nor Brown finds any such abnormal death rate in other cases. In short, not excessive mortality alone, but a decreased birth rate as well, due to the first glimmer of ambition to get ahead in the world, should be taken into consideration. The only way to follow this up, however, is to make an investigation as truly economic and social as it is medical and statistical. Such work demands the most discriminating and impartial scientific observation; the sentimentalist and old-fashioned moralist who sees in the customary "marriages on a church broom-stick" the incarnation of sexual vice, should be rigidly excluded; as well as the average Southerner for whom there is no horror so great as a mixed marriage of black and white. Many branches of science should be contributory; but expert medical opinion and trained economic and social observation are most necessary. The twelfth census cannot enlarge its scope in any direction more profitably than in the conduct of a special investigation of this kind on a comprehensive scale applied to our negro population as

[1] *Op. cit.*, p. 10, ff.

a whole. The prosperity of a large section of our country depends upon the future of the black race; legislation, Federal and state, would undoubtedly be shaped in a great measure by the invaluable results which a wisely-ordered special inquiry of this sort might conceivably yield.

W. Z. Ripley.

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The Census of the North American Indians.

The previous census reports on the North American Indians are principally reviews of the status of the Indians, derived from observations made by special agents, and collected from data furnished in the annual reports of the Commissioner of Indian Affairs.

The collection of satisfactory statistical data from Indian tribes is attended with peculiar difficulties, which are largely due to the multitude of Indian languages, to the necessity of employing interpreters in the collection of data, and also to the impossibility of explaining to the Indians the object of the research. For this reason it seems necessary that the data for the census should be collected largely by men who are in constant contact with the various tribes, that is to say, by the officers of the regular Indian service. Much of the material bearing upon the economic conditions of the Indians, and upon the vital statistics of the various tribes, is contained in the annual returns of the Indian agents. But their reports do not bear upon a number of questions that seem to be of considerable importance.

A census of the Indian tribes should be the means of determining the success or failure of the policy pursued during the past years, and should suggest the policy to be followed in the future. If the census is to be arranged with a view of carrying out this fundamental idea, three problems seem to be of fundamental importance: (1) the effect of the allotment of land in severalty, (2) the effect of boarding schools and of day schools, and (3) the effect of blood mixture between Indians, and whites and negroes.

Previous census reports contain a certain amount of purely ethnological information on various Indian tribes, which was collected incidentally by the agents of the Census Office. It does not seem that information of this character, highly valuable though it may be for scientific purposes, belongs properly to the domain of the census of the Indians, which ought to be confined to demographical questions. There might be an excuse for the collection of this information, if no other agencies were provided by law for collection of data of this description; but, since the Bureau of American Ethnology has been established with the express purpose of collecting data referring to the primitive condition of the Indians, the work of the census in this line is unnecessary, and duplicates the work that is done much more thoroughly and satisfactorily by the trained investigators of the Bureau of American Ethnology than it is by the occasional observations of agents whose prime interest lies in statistical inquiries.

The following questions seem of particular interest in regard to the three points which were designated before as especially desirable subjects for investigation thus: —

1. *Influence of the allotment of land in severalty to the Indians.* — Much of the information that seems desirable in connection with this subject is contained in the annual reports of the Commissioner of Indian Affairs. It would seem particularly desirable to ascertain in some detail the economic condition of Indians holding land in severalty, and to classify the returns that would be obtained under the second and third heading in reference to the questions, whether Indians hold land in severalty, or as a tribal unit; and whether they receive rations, or are self-supporting.

2. *The effect of the school system upon the Indian*

population. — Indian schools may be classed as day schools, boarding schools, and training schools. The influence of the day school upon the child is comparatively slight. In the boarding school the child is removed from its home surroundings for a series of years, and in the training school this separation is emphasized by the removal to a distant locality and by the continuance of this removal for a number of years. It seems very desirable to collect detailed statistics on the fate, in later life, of the scholars in these various classes of schools, in regard as well to their state of health as to their social and economic history, particularly with a view of determining how far school life tends to break up tribal relationship, and promotes affiliation between Indians and whites.

3. *Mixture between Indians, and whites and negroes.* One of the most important problems of Indian policy is the question, in how far it is desirable to promote mixture between the Indians and other races. It is clear that, with the increase in settlement in our country, the chances for the Indian to survive as an independent race will become slighter and slighter. The opinion is frequently held that half-breeds, the descendants of Indians and whites or of Indians and negroes, are much inferior in physique, in ability, and in character, to the full-bloods. But no statistical information is available which would justify a conclusion of this character. If there was a decided deterioration of race, due to mixture, it would seem that the opportunity for race mixture should be limited so far as this can be accomplished. On the other hand, if race mixture seems to be advantageous, it should be facilitated, particularly by bringing the Indians into easy contact with the whites.

For this reason it would seem of great importance to

determine the vitality, the social environment, and criminal statistics of the half-blood as compared with the full-blood and with the white. It would seem that the most satisfactory information on this point could be gathered in the Indian schools, where half-blood children and Indian children may be observed under equally favorable conditions. The investigation should be carried on by a number of observers trained in the methods of collecting information on the bodily development of children. This investigation could be carried out, in the course of two years, on all the Indian and half-breed children attending school. It is indispensable that the inquiry should be extended over a period of two years, because each individual should be examined at least twice, at an interval of not less than one year. The results would be still more satisfactory if the investigation could be repeated at regular intervals through a period of ten years, so as to extend from the twelfth to the thirteenth census. It is of great importance to determine the fertility of full-blood and of half-blood women, an inquiry which could be carried out on the agency with the help of the agent's records, and by means of information that may be collected by the help of agency physicians. Preliminary statistics collected by the writer seem to indicate an increased fertility on the part of the half-blood woman.

The primary object of this investigation would necessitate the collection of data showing the tendency, on the part of half-breeds of both sexes, to leave the tribe to which they belong, and to merge themselves in the white population. Statistics collected in certain parts of western Canada seem to indicate that the female part of the population is more likely to leave the tribe than

is the male population, and that the male half-blood is likely to marry a full-blood Indian, while the female half-blood is likely to marry a white man.

It would be quite feasible to collect information in regard to the data mentioned here, and the results of the investigation would have an important bearing upon the shaping of our Indian policy.

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Any consideration of either theoretical or practical census work should not fail to take into account the various limitations to which each investigation is subject, as well as those to which the office as a whole is subject. The Superintendent and his chiefs are early confronted with questions of time and money.

More especially the matter of time is important in the planning of the work. It will not do to construct a scheme, even in population, agriculture, and manufactures, that cannot be executed to its end, a satisfactory tabulation, in less than about five years, and a large portion of the results in these leading branches of census work should be available to the public within two or three years.

It is apparent, therefore, to one who is familiar with the magnitude of the work of a census office as it has been conducted during the last two censuses, that any elaboration of census schedules used in the census of 1890, should be undertaken with extreme caution, and that, on the contrary, it might be better to reduce the number of questions.

Another matter to be considered in planning census work relates to the printing of final reports. It is very easy to elaborate a scheme of tabulation to such an extent that the report will be too diffuse and will render it difficult for one who examines it to find the information that he wants. There is no use, for instance, in presenting a table stating that two persons died of scarlet fever in a certain sanitary district within a year. or that there was one homicide in a certain county,

Much of the bulkiness of the reports of the eleventh census would have been prevented if minute details like these, which are of no value at all as statements of fact, had been condensed to larger aggregates.

One of the most deplorable limitations to good and quick census work is the spoils system under which the office has been operated and under which, at this writing, it seems likely to be operated for the twelfth census. The evils of that system are exasperating to those who have charge of the work, because they are incessantly blocking the way, upsetting arrangements, and, at the end, curtailing desirable tabulation because the work has been so long drawn out. It has been said, and is doubtless true, that the completion of the eleventh census was delayed at least one year by the change of administration, March 4, 1893, and it is well known that because of that change of administration some of the contemplated and partly accomplished tabulation had to be given up.

The operation of the spoils system is made worse by putting the Census Office in the Interior Department; but aside from any consideration of this sort it would be much better to make the Census Office an independent bureau, responsible directly to the President, which would mean practically that the Director would be the supreme head of the office. The President would not undertake to dictate to the Director what the organization of his office must be, whereas Secretaries of the Interior have been known to do this to an extent which was very detrimental to the good of the office.

AGE.

In the census of 1890 the enumerators were instructed as follows:

"*Age at nearest birthday. If under one year, give age in months.*

"Write the age in figures at nearest birthday in whole years, omitting months and days, for each person of one year of age or over. For children who on the 1st of June, 1890, were less than one year of age, give the age in months, or twelfths of a year, thus: 3/12, 7/12, 10/12. For a child less than one month old, state the age as follows: 0/12. The *exact* years of age for all persons one year old or over should be given whenever it can be obtained. In any event, do not accept the answer "don't know," but ascertain as nearly as possible the approximate age of each person. The general tendency of persons in giving their ages is to use the round numbers, as 20, 25, 30, 35, 40, etc. If the age is given as "about 25," determine, if possible, whether the age should be entered as 24, 25, or 26. Particular attention should be paid to this, otherwise it will be found when the results are aggregated in this office that a much more than normal number of persons have been reported as 20, 25, 30, 35, 40, etc., years of age, and a much less than normal at 19, 21, 24, 26, 29, 31, etc." [1]

These instructions seem to me to be perfect; they are explicit, clear, and neither too long nor too short.[2]

[1] Eleventh Census. Instructions to Enumerators. 23.

[2][It may be mentioned here, as it is not, I believe, in the Eleventh Census, that the question asked in 1880 was, "Age at last birthday," and in 1890, "Age at nearest birthday." No reason for the change is offered and its wisdom may be doubted. A person usually regards his age as equal to the number of birthdays he has passed. Any attempt by the census to ask a question involving a different conception seems unwise and likely to be misleading. The average age of the population of the United States in 1880 was 24.1 years, in 1890, 25.1 years. (Eleventh Census, Abstract 7.) Of this increase of a year in the average age, a part lying between zero and six months was due to the change in the form of the question, and no one can tell how much. My conjecture is that among adults the part was almost negligibly small. Some evidence of an effect upon the reported ages of children may be derived from the figures. Under the instructions quoted by Mr. Holmes, the children reported in 1890 as one year old should have included only those between twelve months and eighteen months, while in 1880 those one year old should have included all between twelve months and twenty-four months. The figures show that in 1880 eighteen per cent of the children under five were one year old, while in 1890 only fourteen per cent were so. The true percentage was probably over twenty. As the ages of adults were stated in 1890 with decidedly more accuracy than in 1880 (Am. Stat. Assn. 5: 133), this decreased accuracy may plausibly be assigned to the change in the form of the question. If so, at least 300,000 children between eighteen and twenty-four months were reported as two years old.—W. F. W.]

It is needless to enter into any discussion as to the desirability of obtaining the statistics of the ages of the population, but there is room for discussion with regard to tabulation.

The method adopted for the census of 1890 was to group the months and make a total for age under one year, and then group the years, thus: 1 to 4, 5 to 9, 10 to 14, etc.

It seems generally to be agreed by those who have given the distribution of ages as reported by enumerators any consideration for the purpose of tabulating them, that such a grouping as this should not be repeated. The years which are notoriously erroneous, that is, the quinquennial and decennial years, are placed at one end in each classification.[1]

The English census, in one table at least, has grouped by quinquennial years up to, but not including, 25, and then grouped every ten years, beginning with 25, 35, 45, etc., the object being to put the most erroneous age-year of the group as near the middle as possible. But, in doing this, the scheme allows the age-year, which is of second importance (25, 35, etc.), to be at one end of the group. In this way a subdivision of the decennial groups into quinquennial groups was made impossible, and quinquennial groups are the more useful, if both groupings cannot be had.

I would suggest that a quinquennial grouping should be continued under a new arrangement, the first group

[1] [It may be noticed that there is no traceable concentration on the ages 5 and 15 and little on 10 and 20. It is not until after the age of 20 that the tendency to concentrate on multiples of 5 becomes evident (Am. Stat. Assn., 5: 133). Before that the tendency is to concentrate on the even years and especially on the years 14, 16, 18, or 21 (the last only for males) which bring some legal privileges or immunities. W. F. W.]

to contain ages under three, the next groups to be 3 to 7 years, 8 to 12, 13 to 17, and so forth. This would place the especially erroneous years in the middle of the groups in every case.

In the tabulation of the scheme of the eleventh census ages were tabulated by sex, general nativity, and color, by states and territories, and by cities of 25,000 inhabitants or more, as shown in the following statement:

Ages of the aggregate population of the United States, classified by sex, general nativity, and color.

Ages of the aggregate population, classified by sex, general nativity, and color, by states and territories.

Ages by periods of years of the aggregate population, classified by sex, by states and territories.

Ages by periods of years of the native white population of native parentage, classified by sex, by states and territories.

Ages by periods of years of the native white population of foreign parentage, classified by sex, by states and territories.

Ages by periods of years of the foreign white population, classified by sex, by states and territories.

Ages by periods of years of the colored population, classified by sex, by states and territories.

Ages by periods of years of the aggregate population, classified by sex, general nativity, and color, for cities having 25,000 inhabitants or more.

The tabulation of ages for the larger cities[1] is especially noteworthy, and the continuance of tabulation for such cities should be repeated in every census. The importance of the urban population in its relative and increasing magnitude has become such that a tabular presentation of facts for the urban population, as distinct from the remainder of the population, should be extended to all tables embracing the whole country wherever the facts are pertinent to the city population either positively or negatively. The limitation of this tabulation of ages in these cities to sex, general nativity, and color was

[1] Eleventh Census. Population, 2 : 114–134, Table 8.

probably due to circumstantial limitations prevailing in the office of the census; and, while this tabulation was more elaborate than that of any previous census or than that of any other country, and the relating of ages to these elements of the population seems to be very desirable, I would suggest that it would be desirable also to tabulate ages by conjugal condition.

In the latest censuses of various countries, ages were tabulated as follows:

England and Wales: By sex; by conjugal condition and sex; by sex, with subdivision of the population into urban and rural; by sex and the defective classes; by sex and the occupations of the blind; by sex and the occupations of the other defective classes; by sex for the mentally deranged in asylums and workhouses; by sex and conjugal condition for the pauper inmates of workhouses; by sex and conjugal condition for prisoners; by sex and nativity; by sex, conjugal condition, and nativity.

In Belgium, the ages are presented in groups by sex. The German tabulation is by sex and conjugal condition. The French tabulation of ages is in groups by sex and occupation; by sex and conjugal condition; and there is a tabulation of ages for the urban population.

Upon examining what has been done in foreign countries with respect to the tabulation of ages, there is little that is practically suggestive.

Desirable as it would be to tabulate occupations by ages, the number and classification of occupations to which our future Census Office is virtually committed would call for a table in such detail that considerations of time consumed and printed space required practically bar out such a tabulation.

SEX.

Little is to be said with regard to sex beyond what incidentally appears in the rest of this paper. All are so agreed that in all population tables the distinction of sex should be made, and this is so universally the practice, that there is nothing to be done beyond expressing a caution against omitting sex from any tabular presentation for which sex is known.

DWELLINGS AND FAMILIES.

The family is such an important social element that I cannot assume any one would seriously question the tabulation of the number, and to this I would add that the family should in some way be related statistically, to its home.

The practice of the national census has been to establish a relationship between the number of families and the number of dwellings.

The following were the instructions defining a dwelling-house:

"A dwelling-house for the purposes of the census means any building or place of abode, of whatever character, material, or structure, in which any person is living at the time of taking the census. It may be a room above a warehouse or factory, a loft above a stable, a wigwam on the outskirts of a settlement, or a dwelling-house in the ordinary sense of that term. A tenement house, whether it contains two, three, or forty families, should be considered for the purposes of the census as one house. A building under one roof suited for two or more families, but with a dividing partition wall and a separate front door for each part of the building, should be counted as two or more houses. A block of houses under one roof, but with separate front doors, should be considered as so many houses, without regard to the number of families in each separate house in the block. Wholly uninhabited dwellings are not to be counted."[1]

I fail to see that a relationship between number of families and number of dwellings is of sufficient import-

[1] Eleventh Census. Instructions to Enumerators. 19.

ance to be worth the tabulation. It may have had some importance before the erection of large tenements and flat-houses, and before the character of the home underwent the great change that the growth of cities and towns has imparted to living. The original, and continued, object of relating families to number of dwellings was, and is, to measure statistically the degree of crowding. But these statistics no longer measure this, or certainly not in the sense that they measured it in the past.

In some southern county there may be a dwelling to every family, inhabitants being, say, largely composed of negroes in a cotton region; but these families, for the most part, may be living in very small quarters and in mere cabins, and the average of one dwelling to a family should not be received as having any significance at all.

In cities, on the other hand, while a ratio of dwellings to families would give some indication of density of population, it might give no indication of floor space-crowding, since the dwellings are of such indefinite size in cities and many of them are not only large but afford very commodious space.

I would, therefore, recommend that no further statistics of the number of dwellings be published; but, as I have said, some sort of relationship between the family and its home, as indicating family circumstances, should be adopted. The facts taken for this purpose must be very few in number and must be easily ascertainable and represented without a special schedule and without somewhat elaborate inquiry into the home circumstances, which, of course, would be practically out of the question.

I think of nothing else that might be feasible, and at the same time indicate fairly significant results, which is as good as taking the number of rooms occupied by each

family, regardless of the number of families that there may be in the dwelling. The number of rooms is readily ascertainable by any enumerator, as has been demonstrated in Massachusetts and in France and England, and the returns present no difficulties to the tabulator.

It would be inadvisable to change the definition of the word family for statistical purposes. The enumerators of the eleventh census were instructed as follows:

"The word family, for the purposes of the census, includes persons living alone, as well as families in the ordinary sense of that term, and also all larger aggregations of people having only the tie of a common roof and table. A hotel, with all its inmates, constitutes but one family within the meaning of this term. A hospital, a prison, an asylum is equally a family for the purposes of the census. On the other hand, the solitary inmate of a cabin, a loft, or a room finished off above a store, and indeed all individuals living out of families, constitute a family in the meaning of the census act.

"By 'individuals living out of families' is meant all persons occupying lofts in public buildings, above stores, warehouses, factories, and stables, having no other usual place of abode; persons living solitary in cabins, huts, or tents; persons sleeping on river boats, canal boats, barges, etc., having no other usual place of abode, and persons in police stations having no homes. Of the classes just mentioned the most important, numerically, is the first, viz.: those persons, chiefly in cities, who occupy rooms in public buildings, or above stores, warehouses, factories, and stables. In order to reach such persons the enumerator will need not only to keep his eyes open to all indications of such casual residence in his enumeration district, but to make inquiry both of the parties occupying the business portion of such buildings and also of the police. In the case, however, of tenement houses and of the so-called 'flats' of the great cities as many families are to be recorded as there are separate tables.

"A person's home is where he sleeps. There are many people who lodge in one place and board in another; all such persons should be returned as members of that family with which they lodge." [1]

To depart from the foregoing definition of a family, which has been substantially the one adopted previously, would be uncalled for, but it does seem necessary that there should be some improvement in the tabulation of families. A mere average of the number of persons to

[1] Eleventh Census. Instructions to Enumerators. 20.

a family, while useful for some purposes, is far from being as useful as a statement of the number of families having a specified number of members. A presentation of facts in this way, not only for the number of persons in a family, but in nearly all other cases of the sort, is so generally agreed upon by statisticians and students of statistics, that I feel it needless to do more than make the suggestion.

The instructions given to the enumerators of the census of 1890 were very well prepared, and I submit below extracts from them relating to the family:

"*Number of persons in this family.*

"The answer to this inquiry should correspond to the number of columns filled on each schedule, and care should be taken to have all the members of the family included in this statement and a column filled for each person in the family, including servants, boarders, lodgers, etc. Be sure that the person answering the inquiries thoroughly understands the question, and does not omit any person who should be counted as a member of the family."[1]

"*Relationship to head of family.*

"Designate the head of a family, whether a husband or father, widow or unmarried person of either sex, by the word 'Head;' other members of a family by *wife*, *mother*, *father*, *son*, *daughter*, *grandson*, *daughter-in-law*, *aunt*, *uncle*, *nephew*, *niece*, *servant*, or other properly distinctive term, according to the particular relationship which the person bears to the head of the family. Distinguish between *boarders*, who sleep and board in one place, and *lodgers*, who room in one place and board in another. If an inmate of an institution or school, write *inmate*, *pupil*, *patient*, *prisoner*, or some equivalent term which will clearly distinguish inmates from the officers and employés and their families. But all officers and employés of an institution who reside in the institution building are to be accounted, for census purposes, as one family, the head of which is the superintendent, matron, or other officer in charge. If more than one family resides in the institution building, group the members together and distinguish them in some intelligible way. In addition to defining their natural relationship to the head of the institution or of their own immediate family, their official position in the institution, if any, should be also noted, thus: *Superintendent*, *clerk*, *teacher*, *watchman*, *nurse*, etc."[2]

[1] Eleventh Census. Instructions to Enumerators. 20.

[2] Eleventh Census. Instructions to Enumerators. 22,f.

Most of the censuses of foreign countries took account of the number of dwellings, and France ascertained various details relating to the home, as the number of living rooms, number of stories, etc.

In the latest English census tenements with less than five rooms were tabulated as having one, two, three, four, and over four rooms, and also by number of occupants. The instructions were that, "all the space within the external and party-walls of a building was to be considered a separate house. . . . . By a 'tenement' was to be understood any part of a house occupied either by the owner or by a tenant."[1]

The use of the word "tenement" in the English enumeration led to considerable confusion; no instructions were given as to what constituted "a room."

The experience of the latest English census sustains me in advising that there should be no tabulation of the number of dwellings. The Registrar writes that the instructions in regard to dwellings and tenements "were not universally observed, and often a block of buildings consisting, according to the definition, of several distinct houses, was treated as a single house, while on the other hand portions of one and the same house held as different tenements, were often counted as separate houses. There is, moreover, very good ground for believing that the introduction into the enumeration book of a new column in which particulars were to be inserted as to the number of rooms in a tenement has, by confusing the enumerators, materially added to the frequency of these errors, so that the figures must be received with some reservation."

The last Scotch census ascertained and published the

[1] Great Britain Commons Papers 1893, volume 106. Census of England and Wales. General Report. 20.

number of families, with specified number of members by number of rooms with specified number of windows and rooms without windows.

In our census of 1890 tables were published, as shown by the following description :

DWELLINGS AND FAMILIES.

Total dwellings and persons to a dwelling, by states and territories.
Total families and persons to a family, by states and territories.
Total dwellings and families, and persons to a dwelling and to a family, by counties.
Total dwellings and families, and persons to a dwelling and to a family, for places having 2,500 inhabitants or more.
Persons to a dwelling, in detail, by states and territories.
Persons to a dwelling, in detail, for cities having 25,000 inhabitants or more.
Persons to a family, in detail, by states and territories.
Persons to a family, in detail, for cities having 25,000 inhabitants or more.
Number of dwellings having specified number of familes, with average number of families to a dwelling, for cities having 100,000 inhabitants or more, and by wards for certain cities.
Number of families in dwellings according to specified number of families, for cities having 100,000 inhabitants or more, and by wards for certain cities.

The Massachusetts census of 1895 ascertained, in considerable detail, the number of rooms occupied by families (not the number of families in a dwelling-house), and a description of the materials of which dwellings were constructed. Even if it were desirable, a national census could not undertake to ascertain the sorts of materials entering into the construction of dwellings, because the work of the Census Office could not stand so much elaboration.

URBAN POPULATION.

I have already incidentally mentioned the subject of urban population, and expressed the desirability of pre-

senting tables for the larger cities for the subjects that are related, either positively or negatively, to city life. I would say that the work of the census of 1890 in presenting tables for cities should be repeated and extended.

It would hardly seem advisable to increase the work previously done in the preparation of social statistics of cities, but rather to see that the work is placed in expert hands in order that its accuracy may be assured. I would suggest, however, that in the work on the social statistics of cities, a special study of suburban transit be made, and for that purpose I submit the accompanying table, which is supposed to represent all of the lines for passenger transportation running from suburban towns and cities to New York city, and is to include the trains running to the city; a similar table to be provided for trains running from the city:

POPULATION.	TIME TO CITY HALL. New York city { Surface cars. Elevated. Ferries. Steam railways.							
Number of trips possible in 24 hours.	*Minutes.*							
	Less than 5	6–10	11–15	16–20	21–30	31–45	46–60	60–120
4								
5								
6								
7								
8								
9								
10								

Such a table as the foregoing is a matter of no singular importance, but is merely intended to be a part of the so-called social statistics of cities. Its object is to show how it happens that the long feared congestion of population in parts of large cities is, or may be, relieved.

It hardly seems within the scope of this paper to present, in detail, the varied investigations that need to

be carried on in the collection of social statistics of cities. It is a work of many details, and to formulate a scheme of investigation would require months.

The subjects of urban growth, of the effects of city life upon the people physically, morally, mentally and financially, of municipal finance and management, the question as to whether, and to what extent, the municipality should own gas-works, water-works, etc., and many other problems that I do not need to mention, afford numerous opportunities for statistical work on this subject, but to what extent the Census Office should undertake them, is open to discussion. Some of this field has already been covered by the Department of Labor, and some by other statistical offices, not always, it is true, thoroughly and extensively, but yet, in the case of the Department of Labor, extensively enough to indicate that the field can be covered by a statistical office smaller than that of the Census Office, and, therefore, that the census need not be burdened with such work.

The matter of tabulating the entire population with regard to relationship to the head of the family calls for no suggestions. This tabulation, which has been omitted in the past, should be included. I suppose that there is no disagreement as to the desirability of these statistics, and in their tabulation they would require no expensive elaboration.

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Illiteracy and Educational Statistics.

The collection of statistical data to illustrate the simplest elements of intellectual accomplishment and to serve as a measure of society's activities in educating the people of the land was first attempted for the whole country in the census of 1840, and this branch of census work has been continued in each succeeding enumeration. From the first there have been two main lines of inquiry: first, the data collected on the general population schedules concerning the literacy of the population, that is, the ability of each individual over a certain age to read and write; secondly, the data in regard to the number of teachers, the educational institutions, expenditure, and other facts which would illustrate the great social effort being made to uplift the people by education, and the degree to which such opportunities are used as indicated by the number of pupils attending. The subject, therefore, may be conveniently divided into two parts, illiteracy and educational statistics.

Illiteracy.

In the census of 1840 an enumeration was made of the number of white persons over 20 years of age who could not read or write. In 1850 a beginning in the classification of illiterates was made, distinguishing them as white and free-colored, native and foreign. The returns were tabulated by counties. The superintendent expressed the opinion that the statistics, so far as the whites were concerned, were reliable. The same classification was followed in 1860, but the returns were not tabulated for minor civil divisions. In 1870 a change was made in the form of the schedule,

and the table formerly reading, "Persons over 20 years of age who cannot read or write" was subdivided into two columns: "cannot read," and "cannot write." The editor notes "that, great numbers of persons rather than admit their ignorance, will claim to read, who will not pretend that they can write. . . .If a man cannot write, it is fair to assume that he cannot read well; that is, that he really comes within the illiterate class. . . . Taking the whole country together, hundreds of thousands of persons appear in the class 'cannot write' over and above those who confess that they cannot read. This is the true number of the illiterate of the country; the class which it is now necessary to treat, for the simple safety of our political institutions."[1]

The limitation of age was also modified so as to include all persons above ten years of age. "Those between the ages of ten and twenty who cannot read and write are to constitute the class which in ten years more will form the hopelessly illiterate of another census. It is as important to determine the numbers of our youth who are growing up in ignorance, . . .as to determine the number of those who have passed the period of youth in ignorance and who will, with few exceptions, remain illiterate through life."[2] At the request of the Commissioner of Education and others interested in public education, the illiterates were divided according to age into three classes, 10–15, 15–20, 20 and over. The classification then is as follows: cannot write, distinguished as white and colored, and native and foreign. Once more the returns are given by counties. There is also a map showing illiteracy of the eastern half of the United States.[3]

[1] Ninth Census. Population and Social Statistics, xxx.
[2] *Ibid.*
[3] *Idem.*, 393.

The census of 1880 in general followed that of 1870. Separate columns are given for those above ten years of age unable to read and those unable to write. Illiterates are also distinguished as white, native white, and foreign white, 10 years of age and upward, and the white and colored for the three age groups distinguished by sex. The tables are not worked out for subdivisions below that of states.

In 1890 the tabulation of statistics of illiterates was very wisely carried much further, although little change was made in the form of questions asked.[1] Of special importance was the classification of parentage of the native white population. This is a proper distinction, as it might be expected that those of foreign parentage would not be so eager to force their children to take advantage of educational opportunities as would those whose native ancestry was of a longer period. A distinction was made, also, in the colored population, between those of negro descent and the Chinese, Japanese and civilized Indians.

A new age classification is presented as follows: 10–14, 15–19, 20–24, 25–34, 35–44, 45–54, 55–64, 65 and over, and unknown. Through such a classification as this, it is possible to draw some inferences as to whether a state is keeping up an educational pressure or not. There ought to be by right a lower percentage of illiteracy among the native whites of native parentage in the age group 10–14 than in the group 15–19; and in every one of the North Atlantic states this is the case. In the South Atlantic states, however, beginning with Delaware, with the exception of Maryland, the percentage for the lower age group is greater in comparison for this whole section of states, being 14.8 for the age group

[1] Eleventh Census. Population, 2: xxx–lx and 193–252.

10–14 and 11.5 for the age group 15–19. Of course this increase in the lower age group may be due to the fact that there is more deception to be found in the older group than in the younger, or that opportunities to read and write have come to the population after they have passed the age of 14.

Such an age classification will also show how far an American state influences a foreign-born population provided it can get its educational machinery at work upon it early enough. For example, Massachusetts with her compulsory law has exerted such activity that among the foreign-born population, in the age group 10–14 but 3.4 per cent are illiterate, while in the age group 15–19 the percentage is 11. For the United States as a whole the respective percentages are 5.9 and 10.1

Of equal importance is an age group classification in studying the education of the colored race. It is not encouraging, for example, to find in Alabama that, while for the age group 15–19 the illiterates comprised 55.8 per cent, in the age group 10–14, they were 52.5 per cent. In Mississippi, however, there is a decrease from 44.4 per cent in the higher age group to 36.6 in the lower.

No percentages are worked out for age subdivisions above 20, and it is unfortunate, though by no means an important error, that in some minor groupings the age classification for the absolute numbers of illiterates is not the same as obtains in the regular age classification. Of the total population, for example, the general age classification is as follows: 20–24, 25–29, 30–34, 35–44, 45–54, 55 and over. The illiterates are classified as 20–24, 25–34, 35–44, 45–54, 55–64, 65 and over. The combination of figures for the age group 25–34 therefore requires a previous adjustment.

Again, the degree of illiteracy is distinguished by reporting those who can read but cannot write and those those who can neither read nor write, and these are further classified in regard to sex, nativity and parentage. Whether a part of this tabulation might not be abandoned in favor of others is, I believe, a fair question to raise. For example, it would be helpful to know whether the native born illiterates, particularly of the age classes 10–14, and 15–19, were born within their own state; and of the foreign born, it is highly desirable that their particular nationality should be given in order that we may know what countries are furnishing us the largest amount, not merely of temporary, but of more or less permanent illiteracy.

In addition to classification by states, statistics are given for 124 cities having 25,000 or more inhabitants, for sex, nativity, degree of illiteracy, and age.

A new and interesting inquiry was introduced in 1890 in regard to ability to speak English.[1] There are tables showing the total number of persons 10 years of age and over who cannot speak English, classified by foreign nativity, parentage and color, for states and also cities having 25,000 or more inhabitants. These are classified as to sex and according to the usual age groups. Information was also gathered upon the schedules regarding the particular language spoken by the individual unable to speak English, but for lack of time the data as to the various languages spoken were not worked up. Such a tabulation would be of great interest in connection with the statistics of immigration, for in that way an estimate might be made of the degree of assimilation of foreigners from different countries. It is to be hoped that it will be insisted upon in the twelfth census.

[1] *Idem.*, lx–lxv, and 253–278.

In the use of statistics of illiteracy, questions arise as to the probable accuracy of the data. Here it is impossible to speak with any positiveness, since it is difficult, and for the whole country impossible, to secure any index by which we can test returns. In Massachusetts, reports of illiteracy were published in the state censuses of 1875 and 1885. The several censuses give the number of illiterates as follows:

1875 state census	104,513
1880 U. S. "	92,980
1885 state "	122,263
1890 U. S. "	114,468

It will be observed that the state census of five years previous to that of the United States enumerates more illiterates than does the latter; personally, however, I do not believe that a variation of about 10 per cent in an inquiry of this character, necessarily invalidates the usefulness of the returns.

In the grouping of the statistics of illiteracy there is another consideration as to whether the census should follow the customary grouping of states followed in other classifications of the population. For example, what is known as the Western division includes New Mexico. This has 42.8 per cent of native white illiterates and Arizona has 7.9. The next highest in the scale of illiteracy in this group is Colorado with 3.8.[1] New Mexico and Arizona have an entirely different past history from that of the other states. They include a native white population, of Spanish descent, which has remained for a long time stationary in its educational development. If we should throw out New Mexico and Arizona, the percentage of illiteracy for the Western group in the class of native whites would be less than

[1] *Idem.* xxxv.

that of the North Atlantic division. So, too, in the South Central division Missouri is included which has a different social past than that of the other states included in this group. It would also be helpful if tabulation could be made of rural districts as distinguished from the large cities, and possibly the tabulation might include a few states by counties.

Educational Statistics.

The statistics of school attendance are furnished for the census in two ways: first, by returns on the general population schedules; and secondly by reports made by educational institutions in a special monograph. From the population schedules, the character of school attendance is statistically described[1] as follows: the number attending school by nativity, parentage of native whites, age groups, as under 5, 5–9, 10–14, 15–19, 20 and over, and these several age groups according to nativity, parentage and sex.

These tables are not worked out in a form as convenient as in the case of statistics of illiteracy. A table is presented for the whole country which shows the percentage of persons attending school, and the total persons of the several age groups 5–9, 10–14, 15–19, 20 and over[2] but unfortunately percentages are not worked out for the several states. If these tables, therefore, are used for local work, reference must be made to the general population returns in order to secure comparative results.

Detailed tables are also given showing the months of school attendance as one month or less, 2–3 months, 4–5 months, 6 months or over, and this is given for the several groups of population according to nativity and

[1] *Idem.* xxvii–xxx and 135–192.

[2] *Idem.* xxvii.

parentage. As to the accuracy of these reports there is considerable doubt. For example, the number of native whites of native parentage, 10–14 in Massachusetts, reported as attending school was 71,065.[1] The total number of such children, however, in the state of that age is tabulated in the general population tables as 75,017.[2] Native whites of foreign parentage, 10–14, are given as 79,406[3] against a total population of the same age group of 86,530. Of foreign whites 10–14, those attending school are returned as 23,291[4] against a total population of 28,820.

The special monograph on education may be regarded as on the whole successful. "In marking out the lines of inquiry for the eleventh census it was determined to use a small number of questions that might be readily answered and whose results could be quickly published. . . . . It was the effort to gather educational facts in the following order: first, according to their importance; second, according to the readiness with which they could be furnished; third, according to the facility with which the results could be combined and published. Under the first principle of selection it was desirable to know (a) How many go to school? (b) Who go to school, indicated by age, sex, and race? (c) How long do they go? (d) What is the character of the work done, as elementary, secondary, or superior? questions applicable in nearly every point to both teachers and pupils. The financial questions were left to be treated by the census division of wealth, debt, and taxation."[5] The expert in charge of this investigation makes an interesting and intelligent criticism of the difficulties in the way of

[1] *Idem.* 150.
[2] *Idem.* 44.
[3] *Idem.* 154.
[4] *Idem.* 158.
[5] Eleventh Census. Report on Education, 1.

securing uniformity of returns. These it is not necessary to rehearse. The difficulties appear to be fully realized, and the editor has consequently been guarded in the deductions which might be drawn. This special monograph is to be commended, since it is the first time the parochial schools have received so detailed a reporting, and statistics for the public schools are also furnished by counties of the several states.

At the same time it is extremely unfortunate that these returns of school enrollment should not agree better with the returns of school attendance printed in the volume on population. The school enrollment, including public, private and parochial schools, largely exceeds the returns given on the general schedules of school attendance. The value, therefore, of one or the other of these returns is immediately open to suspicion. The total enrollment of pupils derived from the reports of schools of the United States is 14,373,670.[1] The return of total persons "attending school during the census year" is 11,674,878,[2] a difference of two million and a third. Again, the total number of teachers returned in the occupation schedules is 341,952;[3] returned by the school enrollment, is 422,929. Even if we should add the professors in colleges and universities, teachers of art and teachers of music, it would be difficult to reach the latter enrollment.

In view of the fact that returns based upon school or institutional reports are annually published by the United States Bureau of Education, it is believed that this field of inquiry might well be omitted in the census. The difficulties so clearly appreciated by the editor

[1] *Idem.* 51.

[2] Eleventh Census. Population, 2 : xxvii.

[3] *Idem.* 304.

of the census monograph are of such a character that the statistical returns need the uninterrupted treatment and consideration of a permanent statistical system such as might to advantage be further developed in the Bureau of Education.

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Statistics of Occupations.

INTRODUCTION.

In any analysis of the population especially from the standpoint of economics, it must be of interest to know what the people are doing. From the standpoint of economics population is looked upon as labor force. This labor force may be employed in one direction or another: in cultivating the ground, in extracting minerals from the soil, in turning raw material into forms fitted to satisfy human wants, in transporting commodities from one place to another, in distributing products among the different members of the community or in rendering personal services. The skill and efficiency with which these things are done is a question of the quality of labor; the number of people engaged in doing these particular things is a question of the quantity of labor and is susceptible of statistical treatment. In every modern census therefore, we have the total population, or at least those engaged actively in production, classified according to occupation.

The first impulse in classifying population according to occupation, is to follow the traditional lines of economic development. We have been accustomed to speak of agriculture, of commerce and trade, of manufactures, or industry, of the liberal professions and possibly of domestic service. We speak of one country as prevailingly agricultural, of another as industrial, of a third as devoted to commerce. The history of economic civilization seems to use somewhat the same categories. Thus, while we speak of early communities in the pastoral or agricultural stage, and think of the mediaeval

period as one of traders and handicraftsmen, we characterize modern nations as commercial-industrial. Even economic categories may be made to follow much the same lines:—as agriculture, mining and fishing are extractive industries, manufacturing creates form-utility, transportation creates place-utility, mercantile trade distributes the products and the professions render economic services thus satisfying human wants.

In most censuses, therefore, we find the population distributed under the following heads.

Agriculture, often including mining and fisheries.
Trade and transportation.
Industry and manufactures.
Professional services.
Domestic services.
Unoccupied.

There are variations of this classification but by combination they can generally be reduced to the above headings.

With such a classification of population, interesting comparisons can be made both in space and time. We can show, for instance, the prevailingly industrial character of the population of England, and the agricultural character of that of Italy. We can compare different sections of the same country, as England and Ireland, Prussia and Bavaria, the agricultural East Provinces of Prussia, and the industrial Rhine Provinces. We can make comparisons in time, showing the growing industry of Germany, or the increasing devotion of its population to trade and commerce. We can detect, as in the case of England, the tendency to employ less of the national labor-force in the work of production proper, and more in that of distribution and consumption.

The moment we begin to make use of such a general

classification, there is at once suggested the thought that the details which lie behind these great classes, might also be interesting. Under the head of agriculture we might like to know, not only the divisions into agriculture proper, mining and fisheries, but also the number of people devoted to cattle-raising, to gardening, to forest-culture, the number of farmers compared with farm laborers, etc. Under the head of industry we should like to know what particular branches of industry, such as iron and steel, the textile industries, making machinery, etc., occupy the population. The number of lawyers, physicians and clergymen suggests itself at once as a suitable method of subdivision under the head of professional services. There seems no limit in this direction to the number of subdivisions. We might like to know the general number of men engaged in the building trades, or, for the purpose of studying certain conditions, the number of brick-layers or hod-carriers. The only question involved, apparently, is whether an occupation is distinct enough to be classified by itself. The census of Massachusetts, in 1885, distinguished horse-radish peddler as an occupation.

Here also we may institute comparisons in space. We can compare the number of men engaged in the iron industry in Germany, France, England and the United States. We can compare the number of cotton spinners in England and the number of spindles with the number of cotton spinners in the United States, and the number of spindles. Such international comparisons are difficult and must be made with caution because of differing nomenclature. Comparisons restrict themselves, for the most part, to the number of men engaged in leading industries.

Comparisons in time within the same country are

somewhat easier. We can trace from decade to decade the increasing number of cotton spinners in England, or the decreasing number of ribbon weavers, or the stationary state of the agricultural laboring population. There may be some dispute about the interpretation of these movements and care must be taken that the statistics rest on the same basis. But with the necessary caution we have here a useful instrument for studying economic changes.

These are the main uses of occupation statistics, but they do not exhaust, by any means, the material. We can correlate the figures for occupation with others pertaining to the population in an almost endless variety of ways. Some of these are as follows:

(a) Sex and occupation. This is very interesting, especially when considering the question of the employment of women in factories, the supplanting of men by women, or the opening up to women of new methods of earning a livelihood.

(b) Conjugal condition and occupation. This throws light upon social conditions accompanying various occupations, and upon practical questions, such as the employment of married women in factories.

(c) Age and occupation. This often gives rise to interesting inferences in regard to the demand of particular occupations upon strength and activity, experience and trustworthiness, capital and financial resources.

(d) Vital statistics and occupation. This correlation has excited great interest as bearing upon the healthfulness of particular employments, danger to life and limb, sanitary and moral surroundings, etc.

(e) Race and nationality and occupation. These are almost peculiar to the United States and have particu-

lar significance both for sociological study and for practical questions of the political and economic development of this country.

Many other correlations are possible as with illiteracy, drunkenness and crime, pauperism, physical and mental infirmity, economic condition, etc., not to speak of triple or quadruple combinations such as age, sex, conjugal condition and occupation. It is evident that we have here a field for interesting comparisons and this field has in fact been cultivated with considerable industry by the statistician, the sociologist, the social reformer and the "crank." Our business, however, is not to consider the results but to determine the quality of the material and the validity of the methods employed.

The vital point of all statistics of occupations is the question of classification. At first sight there would seem to be no difficulty in getting truthful answers to the simple census inquiry, "Occupation!" It is a perfectly natural question, not calculated to excite resentment nor inviting a false answer either from fear of evil consequences or hope of gain. A few persons may be pursuing such dishonest or shameful trades that they wish to conceal them, but their number must be small and they belong either in the criminal class, or from the economic point of view in the unproductive class. Nor would it seem that any person could be so ignorant as not to know the occupation by which he gains his livelihood. There are of course minor difficulties, as when a man pursues two or more occupations, *e. g.*, a country store-keeper who is also post-master, or as when a man is farmer in summer and fisherman in winter, but these minor difficulties are summarily solved by demanding a man's principal occupation,

that is, the one which contributes most to his livelihood, or which he follows the greater part of the year. There is also the question of women and children who assist their husband or father a part of the time in store or shop, thus contributing to the support of the family. They do not really belong to the occupation, in the full sense of the word, any more than the man who writes a letter to the newspaper is really a journalist. We are not trying to measure the exact amount of labor-force expended in particular industries, although in certain cases the influence of this outside competition on professional remuneration may become an interesting subject of study.

The great difficulty in statistics of occupation is to determine what you have in mind when you speak of a person's occupation. Are you thinking of the particular thing that a man does, as hoeing potatoes, or sawing wood, or selling dry goods; or, are you thinking of the product to which he contributes, such as a railroad-car, or a wooden building; or are you thinking of the place where he works, as taking care of horses on a farm, or in a street railroad stable; or are you thinking of the position which he occupies, as the contractor who agrees to lay so many yards of stone work, or the mason who actually handles the stones? Take, for instance, a boss-painter in a car-works shop owned by a railroad; is he a painter, or a car-maker, or a railroad employee, or a foreman? If you ask the man himself he may answer any one of these four things. Either the distinction must be in the mind of the enumerator and he must determine how the answer is to be worded; or he may enter a compound answer, such as:—boss-painter, car-works, Pennsylvania Railroad. In the latter case the responsibility is simply carried one step further and

thrown upon the tabulator. The matter is complicated by the fact that we often need a qualifying term, in order to distinguish two occupations, bearing nominally the same name, but which are really different; and this qualifying term is often the name of the thing produced, the service rendered, or the place where the industry is carried on. Thus, there is a real distinction between an agricultural laborer, a railroad navvy and a day-laborer. The qualifying terms, however, are not intended to classify the men according to industry, but to distinguish the character of their occupation. A street car driver is not the same thing as a private coachman, although both handle horses. On the other hand, it would be a little difficult to define the difference between a hostler in a street car stable, and a hostler in a livery stable.

In order to reach any systematic classification, it is evident that we must keep one object in view and use all our qualifying terms as interpreting that one object, merely, and not as introducing any further classification or supplying any further information. Any other course lands us in inextricable confusion.

METHOD OF THE ELEVENTH CENSUS.

The principle of classification adopted by the Census Office is explained in the following words:[1]

"The primary purpose of the classification in occupations in 1890 has been to show, so far as the returns of the census enumerators would permit, the character of the service rendered or kind of work done rather than to indicate the place of employment or the particular article made or worked upon. From the standpoint of the 'individual' return this is really the only practicable basis for classifying occupations especially as from the returns of the manufacturing, mechanical, and mining industries we are enabled to secure through the census an approximately accurate statement of the average number of persons of all sorts and kinds engaged in each particular indus-

[1] Eleventh Census. Population, 2:lxxvi, end.

try, as derived from the returns of the establishments directly engaged in such production, and from which it is also possible to secure, wherever necessary, a much more minute subdivision and correct classification of the labor essential to the production of any specified kind of goods."

Additional evidence on this point is afforded by the detailed instructions to enumerators. Specimens of these instructions are as follows:

"Do not confuse the agricultural laborer, who works on the farm or plantation, with the general or day laborer, who works on the road or at odd jobs in the village or town. Distinguish also between wood choppers at work regularly in the woods or forests and the laborer who takes a job occasionally at chopping wood."

"Stenographers and typewriters should be reported separately, and should not be described simply as 'clerks.'"

"Distinguish between butchers whose business is to slaughter cattle, swine, etc., and provision dealers who sell meats only."

"In reporting occupations pertaining to manufactures there are many difficulties in the way of showing the kind of work done rather than the article made or the place worked in. The nature of certain occupations is such that it is well-nigh impossible to find properly descriptive terms without the use of some expression relating to the article made, or place in which the work is carried on."

"Distinguish also between glovers, hatters, or furriers who actually make or make up, in their own establishments, all or part of the gloves, hats or furs which they sell, and the persons who simply deal in but do not make these articles."

"Do not use the words 'factory operative' but specify in every instance the kind of work done, as cotton-mill spinner, silk-mill weaver, etc."

"Avoid in all cases the use of the word 'mechanic' and state whether a carpenter, mason, house painter, machinist, plumber, etc."[1]

The office also disclaims,[2] in words quoted from the Tenth Census, the notion that there need be any correspondence between these returns of occupations, and the statistics of persons employed, derived from the returns relating to Manufactures, Mineral Industries and other industrial operations, where the establishment, and not the individual, is the basis of tabulation.

[1] Eleventh Census. Instructions to Enumerators, 25–31, and Population 2 : lxxvii.

[2] Population 2 : lxxviii.

The officials of the eleventh census had a perfectly correct notion of what they were trying to do in the statistics of occupations. How far were they successful in carrying out this method? This brings us to a second great difficulty, namely, to determine what really distinguishes one occupation from another and how many classes of occupations it is necessary to have. The number of employments or kinds of work which differ from each other in some respect is very great. The clerk in a dry goods shop is not engaged in exactly the same kind of work as the clerk in a tailoring establishment. It is obvious, however, that we must throw employments of a similar nature together in order to handle our material. The principle upon which this is to be done is not very clear but can be none other than the general one of the kind of work done. That there is no concensus of opinion on this question is shown by the fact that in the census of 1850 there were 323 occupation designations; in 1860, 584; in 1870, 338; in 1880, 265; and in 1890, 218; which last number in some of the tables is still further reduced to 181. It is not necessary to be hypercritical in this matter,—a few minor occupations more or less make but little difference, provided the more important ones are consistently arranged according to some general principle. How far the eleventh census was successful in such arrangement, can be determined only by inspection. For this purpose, we take up the various occupations arranged under the five great heads, Agriculture, Fisheries and Mining; Professional Service; Domestic and Personal Service; Trade and Transportation; Manufacturing and Mechanical Industries.

The occupations grouped under Agriculture seem to be logical and reasonably distinct. The great mass of persons are either farmers, planters, or overseers (5,281,-

557); or agricultural laborers (3,004,061); with a considerable number of miners (349,592); and the rest are arranged under the heads apiarists, dairymen and dairywomen, fishermen and oystermen, gardeners, florists, nurserymen and vine-growers, lumbermen and raftsmen, quarrymen, stockraisers, herders and drovers, woodchoppers, and "other agricultural pursuits."

The second great group, Professional Service, is also reasonably successful; the main categories, professors and teachers, lawyers, physicians, clergymen, governmental officials, present but few difficulties. There might be some question whether musicians and teachers of music belong to the same class, or why artists and teachers of art, should be separated from musicians. They do very much the same work.

Under Domestic and Personal Service there are domestic servants, nurses and midwives, launderers and laundresses, etc. There are, however, nearly two million "laborers not specified" of whom we shall speak presently.

Under Trade and Transportation we have a number of occupations belonging to trade, such as merchants and dealers, book-keepers, clerks and salesmen, hucksters and peddlers; and others belonging to transportation, such as draymen, hackmen, teamsters, and street railroad employees. The distinction between bankers and brokers, on the one side, and officials of banks and of insurance, trade, transportation, trust and other companies, is not altogether clear.

But it is under the last head, Manufacturing and Mechanical Industries, that the greatest difficulties are met. We have, first, a series of well-defined occupations, such as bakers, blacksmiths, butchers, cabinetmakers, candle, soap and tallow-makers, carpenters and

joiners, coopers, gunsmiths, locksmiths, and bell hangers, masons, painters, glaziers and varnishers, plasterers, plumbers and gas and steam fitters, tailors and tailoresses, upholsterers and wheelwrights, which remind us of a list of the old English handicrafts. The factory system, however, has evidently made itself felt and we have cotton mill operatives, hosiery and knitting mill operatives, mill and factory operatives not specified, paper mill operatives, print works operatives, rubber factory operatives, silk mill operatives and woolen mill operatives. There is evidently considerable danger here of confusing the industry classification with the occupation classification. This danger becomes greater, in some other designations which it was found necessary to use, such as chemical works employees, gas works employees, iron and steel workers, saw and planing mill employees, etc. This confusion becomes greater when we have side by side carriage and wagonmakers (not otherwise classified) and wheelwrights; and such general designations as apprentices, machinists, mechanics (not otherwise specified), metal workers (not otherwise specified), and wood workers (not otherwise specified).

These things are pointed out, not in a spirit of criticism, but as showing the difficulty of any system of classification. It is evident that it would be comparatively easy with a very slight stretching of terms to transpose large bodies of men from one occupation to another. This does not so much matter for any one census, but it makes comparison between different censuses in regard to the number of men of a specified occupation extremely uncertain. This is the probable explanation of some of the extraordinary percentages of increase shown in the comparative tables for 1870, 1880

and 1890, notwithstanding the conscientious efforts to harmonize the occupation groups. For instance, taking only 1880 and 1890, there has been an absolute decrease in the number of agricultural laborers, while farmers, planters and overseers have increased from 4,000,000 to 5,000,000. Bearing in mind that population increased only 24 per cent and the total number of persons engaged in gainful occupations only 30 per cent, it is rather astonishing that lumbermen and raftsmen increased 115 per cent, woodchoppers 165 per cent, fishermen and oystermen, 50 per cent, and miners 50 per cent. So, too, it is rather extraordinary, under professional services, that artists and teachers of art should have increased 147 per cent, musicians and teachers of music 100 per cent, while professors and teachers increased only 50 per cent. Under the head of trade and transportation, book-keepers, clerks and salesmen increased nearly 90 per cent. Under manufactures and mechanical industries, we have carpenters and joiners increasing 60 per cent, and painters, glaziers and varnishers, 69 per cent. On the other hand we have an absolute decrease of cabinet makers, carriage and wagon makers, coopers, gold and silver workers, and wheelwrights.[1]

Doubtless many of these cases can be explained as due to changes in industry and others probably represent the more careful enumeration and classification of the eleventh census. But such facts introduce an element of uncertainty into all study of changes in employment from decade to decade.

On the whole, therefore, although the eleventh census propounded a logical system of classification, it does not seem to have been particularly successful in carrying it

[1] Eleventh Census. Population, 2:ci,ff.

out. Whether this was owing to the inherent difficulty of the subject or to the lack of care and intelligence on the part of the enumerators, it is impossible for an outsider to say.

It must be noticed, too, that the grand groups, Agriculture, Professional Service, Trade and Transportation, etc., are made up by combining the occupation groups. These grand heads, at first blush, would seem to be a classification by productive industry, and we are thus seeking an industrial grouping on the basis of occupational returns. This leads to some anomolous results. It is true, perhaps, that a book-keeper in a cotton mill may be said to belong to trade, a porter in a brewery to transportation, and a laborer in any of these undertakings to be rendering personal service. But such a distinction is an unnatural one and gives an air of unreality to the grouping. It does not seem quite right that engineers and firemen (not locomotive), should be put down to domestic and personal service, when the mass of them are, probably, in factories and workshops. The most serious item is the 1,913,373 laborers not specified, who constitute nearly one-half of the persons classified under the head of domestic and personal service. Doubtless many of these are really agricultural laborers, who are often returned simply as laborers. Many of them, however, must belong to manufacturing and mechanical industries. It is not quite clear how, starting with our principle of occupation statistics, we can group them into these great divisions. But it is quite clear that the procedure in itself is not particularly satisfactory. The result of this criticism is that we must be cautious about using these figures for comparative purposes, either in space (sections of the country), or time (increase or decrease of particular industries). On the other hand

where simply indications are needed, as the appearance of a new industry or the increased employment of women, or the prominence of certain nationalities in general lines of industry, such as mining, or iron and steel-working, they may be used. These facts will come out more clearly when we examine critically the use the census has made of these figures in its comparative tables. We shall not pretend to give results except as illustrations of this great question of method.

RESULTS OF THE ELEVENTH CENSUS AND METHODS OF ANALYSIS.

The Number of the Employed.—The first figure is the number of persons engaged in gainful occupations in the United States in 1890. For this purpose are considered only persons ten years of age and over. The total number was 22,735,661, out of a population ten years of age and over of 47,413,559. This makes 36.3 per cent of the total population, or 48 per cent of the population ten years of age and over.[1]

This figure of course is fundamental and shows that a little over one-third of the total population supports the remaining two-thirds. Comparisons in space are shown on the following page of the census volume, where the number of persons ten years of age and over engaged in gainful occupations is compared for each division and each state and territory of the United States. There are considerable variations, the proportion of persons engaged in gainful occupations of the population ten years and over varying from 41 per cent in West Virginia to 67 in Montana. The cause of this variation is doubtless the age constitution and the character of the prevailing industries. In a state like Montana we should probably find a large number of male adults, engaged in mining

[1] Eleventh Census. Population, 2:lxxx.

and other occupations where only men are employed. There would be few women and children and little or no employment for them. The proportion of persons, therefore, engaged in gainful occupations will be large. In an older state there would be more women and children and, if the opportunities for employment were small, the percentage of persons engaged in gainful occupations would be small. We may have an intermediate condition of things, namely, a state like Rhode Island (56.4 per cent), where there is a large number of women and children and where opportunity is given for their employment in factories. An exceptional case seems to be a state like South Carolina where 55 per cent of the population ten years of age and over are engaged in gainful occupations. The explanation here is that large numbers of negro women and children work in the field. Our comparisons in space amount to but little in themselves and need to be explained by differences of age constitution and industrial environment.

Comparisons in time might seem to be useful as showing whether an increasing or decreasing proportion of the population is engaged in productive industry. The census shows[1] that, while in 1890 36.3 per cent of the total population and 48 per cent of the population ten years of age and over were engaged in gainful occupations, in 1880 the per cents were 34.7 and 47.3 respectively. This would seem to show an increase in the number of persons. The difference, however, is due to the fact that the proportionate number of children in 1890 (at least those returned by the census) was considerably less than in 1880.

Occupation and Sex.—The first analysis of occupation statistics is by sex, that is, to show the proportion

[1] *Ibid.*, lxxx.

of male and female persons engaged in gainful occupations. Many interesting questions are connected with this distinction, especially when we make note of changes in time, differences in space, characteristics of particular occupations and of particular elements of the population, such as the colored, the foreign-born, the children of the foreign-born, particular nationalities, etc.

In making this analysis by sex there are two methods which must be kept distinct, for they serve different purposes. In the first place, we may say that out of one hundred of the population ten years of age and over, engaged in gainful occupations, 82.8 per cent were males and 17.2 per cent were females. And we may carry this out for various occupations as follows:[1]

	Males.	Females.	Total.
Agriculture, fisheries and mining,	92.5	7.5	100
Professional service,	67.0	33.0	100
Domestic and personal service	61.7	38.3	100
Trade and transportation,	93.1	6.9	100
Manufacturing and mechanical industries,	79.8	20.2	100

This method is interesting as showing in a general way how far the two sexes contribute to the number of persons engaged in different industries. It is a bad method, however, the moment we attempt to make comparisons either in space or time. For, the proportion of the sexes being different in different sections or at different times, that would naturally make a difference in the proportion engaged in gainful occupations.

The second method consists in determining, out of one hundred persons of either sex, how many are engaged in gainful occupations. It thus appears[2] that 77 per cent of the male population ten years of age and over, are engaged in gainful occupation, while only 17 per cent of the female population ten years of age and

[1] *Idem*, xc.

[2] *Idem*, lxxxiii.

over are thus engaged. This method answers the real question as to the employment of women as compared with men. It also permits comparisons in space and time. We have for instance, the comparisons for different parts of the Union. In the North Atlantic division 20.5 per cent of the female population ten years of age and over are engaged in gainful occupations, while in the North Central division only 12.5 per cent are thus engaged. This points to the factory industry in the first group of states. As far as time is concerned it would seem that the employment of women is increasing, for in 1880 only 14.7 per cent of the female population ten years of age and over were engaged in gainful occupations, as compared with 17.0 per cent in 1890. The method has its limitations, as we shall see further on, but on the whole it seems to be valid[1]

Occupation and Age.—The second correlation is that of determining the ages of the persons engaged in gainful occupations. Here as before we have two methods. You may take one hundred persons in gainful occupations and show how many are from ten to fourteen years of age, from fifteen to nineteen years, from twenty

[1] A third analysis may be mentioned in this connection which is valid and interesting, *i. e.*, to show how many of 100 males or 100 females engaged in gainful occupations are in each group. (*Idem*, cxi and cxii). The result for the United States is as follows:

	Males.	Females.
Agriculture, fisheries and mining,	44.3	17.4
Professional service,	3.4	8.0
Domestic and personal service,	14.3	42.6
Trade and transportation,	16.4	5.8
Manufacturing and mechanical industries,	21.6	26.2
	100	100

This shows in which industries the males are chiefly employed and in which the females. The comparison is extended to states and territories and for the three censuses, 1870, 1880 and 1890.

to twenty-four years, etc.[1] This method is not very satisfactory for the reason mentioned above, that comparisons in time and space are difficult because of the changing age constitution.

The second method is to take the total number of persons in each age-group and show the percentage engaged in gainful occupations. We have such a comparison[2] showing also the distinction of sex.

The chief question of interest in regard to occupations by age periods is the employment of children. It appears that of males ten to fourteen years 11.2 per cent, and of females 5.9 per cent, are engaged in gainful occupations. "As compared with 1880, this shows a very great diminution in the proportion of children at work, although the exact decrease cannot be determined on account of the slight difference in the age classification of persons occupied in 1880 as compared with 1890. At the census of 1880 there were 825,187 males and 293,169 females ten to fifteen years of age at work, constituting respectively 24.4 and 9 per cent of the whole number of males and females of the ages stated."[3]

A similar comparison of the children ten to fourteen years in each of the elements of the population may be made. This shows that of the colored children ten to fourteen years of age, the percentage engaged in gainful occupations is 29.7, of the foreign born it is 15.6, of the native white of foreign parentage, 7.5, and of the native white of native parentage, 7.4. These figures apply to males; the corresponding figures for females are much smaller.

[1] *Idem*, cxxiii.

[2] *Idem*, cxxi. A third analysis is to show the distribution of 100 males (or females) of each age class, among the different grand occupations (*Idem*, cxxiii). This comparison is interesting and valid, although it is not so generally useful as the one just mentioned.

[3] *Idem*, cxxii.

Other figures for children ten to fourteen years of age show that, out of 100 male children engaged in gainful occupations, 63.9 are engaged in agriculture, 0.1 in professional service, 12.6 in domestic and personal service, 9.8 in trade and transportation, 13.6 in manufacturing and mechanical industries. The corresponding figures for females are: agriculture, 41.4, professional service, .2, domestic and personal service, 38.3, trade and transportation, 2.6, manufacturing and mechanical industry, 17.5.[1]

The next correlation would naturally be between occupation and conjugal condition. We need not go into the results except to say it appears that, of the total number of married women, only 4.6 per cent are engaged in gainful occupations, and that more than one-half of these are negro women.[2] The principal occupations are agriculture, domestic service and manufacturing.[3]

Our comparisons thus far have been of a general nature and apply for the most past to the whole body of persons engaged in gainful occupations distinguished according to certain general marks such as sex, age and conjugal condition. It is probable that even with these grand groups we must be cautious about extending our comparisons very far, either in time or space, because of the imperfection of our material. Especially in regard to particular occupations we must be cautious on account of the uncertainty of the classification.

We come now to a study of peculiar interest to the United States, especially in connection with occupations, namely, the study of the population according to race, birthplace and parentage. The statistics are carried

[1] *Idem*, cxxiii, second table.

[2] *Idem*, cxxvi, table and cxxix, first table.

[3] *Idem*, cxxix, second table.

out in great detail in the census analysis. The question is how far this analysis is based on correct principles and how far the results are trustworthy.

It is necessary to remark in the first place that direct comparison of these different classes with each other is quite useless because of the differences in age constitution. The fact that 58.1 per cent of the foreign white population of ten years of age and over are engaged in gainful occupations as compared with only 43.6 per cent of the native white[1] means nothing, because we know that among the foreign whites adult males are largely represented, while the native whites include many more women and children. Many of the tables in the analysis are of this character and are entirely superfluous if not misleading.

These statistics may be used for the purpose of answering two definite questions: (a) How much each element contributes to the labor force of the United States or to the labor force employed in a particular industry; and (b) How the labor force of each element, as for instance the foreign-born, distributes itself in different industries.

The most important of these questions is the first. That can be answered directly. For instance, out of the 22,735,661 persons engaged in gainful occupations 5,104,757, or 22.5 per cent are of foreign birth.[2] That figure measures the contribution of the foreign-born to the labor force of the United States. We can go a step further and add to the foreign-born the native whites of foreign parents (3,542,408) making 8,647,165 persons of foreign extraction, or 38 per cent of the total labor force.

[1] *Idem*, cxiii, table.

[2] *Idem*, cxvii, table.

By a further step we can show how each element contributes to the labor force in each grand group of occupations. For instance, to agriculture the native white of native parents contribute 56.8 per cent, the native white of foreign parents 8.8, the foreign whites 14.5, and the colored 19.9.[1]

We can extend this method to particular occupations and show what portion of the labor force is contributed by each element of the population. Such a table is given both for males[2] and for females[3] in certain occupations. Some of the results seem exceedingly probable. For instance, the foreign whites constitute only 9.5 per cent of the farm laborers and only 14.7 per cent of the farmers, planters and overseers, while they constitute 44.5 per cent of the gardeners, florists, nurserymen and vine growers, and 48.7 per cent of the miners and quarrymen. They constitute 21 per cent of the clergymen, but only 6.7 per cent of the lawyers. They constitute 49.7 per cent of the restaurant and saloon keepers and 71 per cent of the tailors. The native whites of foreign parents constitute 48 per cent of the apprentices and 45 per cent of the plumbers and gas and steam fitters. These figures are interesting as showing the way in which certain occupations are going into the hands of certain elements of the population.

We may, if we choose, subdivide our foreign-born into nationalities according to country of birth. We can thus show that of 100 foreign-born persons engaged in gainful occupations 28.7 were born in Germany, 20.4 in Ireland, 13.3 in Great Britain, 10.2 in British

[1] *Ibid.*

[2] *Idem*, cxviii.

[3] *Idem*, cxix.

America and so on.[1] The same method is employed for each of the grand groups of occupations.

The census goes even a step further and attempts to analyze the total contribution of persons of foreign birth and descent to the labor force of the United States. For this purpose it takes the number of white persons ten years of age and over, having mothers born in foreign countries, and shows the number and per cent engaged in gainful occupations. The comparison between different nationalities[2] is useless, because the differences are due simply to the differences in the ages. The table on the following page is perhaps justifiable as showing the contribution of each of the foreign elements to the labor force in each occupation. It may be doubted, however, whether this analysis is not carrying refinement a little too far. Even if the principle is correct, the uncertainty of the original data is sufficiently great to make us doubt whether the labor is worth the pains.

We turn back now to our second method of analysis. We may like to know how each element of the population, the foreign-born, colored, native whites of foreign parents and native whites of native parents, distributes itself over different occupations. This is shown in a table[3] where it appears, for instance, that the foreign white population is employed, 25.6 per cent in agriculture, 2.2 per cent in professional service, 26.9 per cent in domestic and personal service; 14 per cent in trade and transportation, and 31.3 per cent in manufacturing and mechanical industries.

This same system is carried out for particular occupa-

[1] *Idem*, cxlvii.

[2] *Idem*, clv, second table.

[3] *Idem*, cxvi.

tions and sex[1] for those born in Germany, Ireland, Great Britain, etc., for grand groups of occupations;[2] for the minor classes of occupations and sex;[3] for persons having mothers born in certain specified countries for grand groups of occupations, and sex;[4] and finally for sex, mother's birthplace and the minor classes of occupations.[5]

It must be observed in regard to this second class of statistics that we, perhaps, are going a little too far. The practical question we have in mind, probably, is what sort of occupations our immigrants choose. We are measuring, as it were, their relative capacity for industrial life, and basing upon it prognostications as to the future. It must be observed, however, that the choice of an occupation depends partly upon sex and age, and thus again differences in age and sex constitution may vitiate our comparisons.

Again, we may use these correlations of occupations with race, birthplace and parentage to answer certain specific questions; as, for instance, whether the native or foreign born are most inclined to employ their women and children in gainful occupations. Thus, it appears that, of the colored female population ten years and over, 36.2 per cent are engaged in gainful occupations; of the foreign white, 19.4 per cent; of the native white of foreign parentage, 20.8; and of the native white of native parentage, 10.9 per cent. But these results are very doubtful. Taking the last two percentages it would seem that the native whites of foreign parents are more heavily represented in gainful occupa-

[1] *Idem*, cxx, f.
[2] *Idem*, cxlix.
[3] *Idem*, cl–clv.
[4] *Idem*, clviii, Table.
[5] *Idem*, clix, ff.

tions than the native whites of native parents as far as females are concerned. If we look at males, we find that of native white males of foreign parentage 70.3 per cent, and of native white males of native parentage 73.9 per cent, are engaged in gainful occupations.[1] Does this mean that the daughters of foreign parents are more inclined to work than the daughters of native parents, while the reverse is true of the sons? The explanation is found in the age classification, where it will be found that, at those ages where females are most employed, namely from 15 to 19, and from 20 to 24, the native white females of foreign parentage are more numerously represented than the native white females of native parents. In plain words this great tendency of females of foreign parentage to go into gainful occupations is due simply to the demand for domestic servants.

The remaining analyses of occupations according to illiteracy,[2] citizenship,[3] and ability to speak English,[4] seem to me to be useless and to confuse cause and effect. The occupation is not the cause of these things, but it is owing to the fact that certain nationalities which have been here for a greater or a shorter time are thrown into certain occupations, that we have these figures.

Finally, the census made an effort by direct inquiry to find out whether persons were unemployed in their principal occupation during the year, and for how long they were thus unemployed. The investigation does not seem to have been very successful, and the data are so uncertain that the detailed analysis by occupations[5] seems to me entirely useless.

[1] *Ibid.*
[2] *Idem*, cxxi–cxxxiii.
[3] *Idem*, clxiii–clxvii.
[4] *Idem*, cxxxiv–cxxxvi.
[5] *Idem*, cxxxvi–cxlii.

What is to be said under this head must be based upon consideration of the experience of this and other countries with the two conflicting systems of classification, and upon our criticism of the analysis of occupation statistics found in the eleventh census. From this study the following points seem to me worthy of consideration.

It is probable that in the twelfth census, as in the preceding ones and in all countries of Europe, it will be necessary to continue the general classification of the population under the grand heads, Agriculture, Trade and Transportation, Industry, etc. The general practice seems to be to put Mining with Manufactures or Industry rather than with Agriculture, and I think the twelfth census would do well to return to the practice of the tenth in this respect. Otherwise the classes may remain as they are. For purposes of comparison with the eleventh census, it will be easy to transfer Mining in that census to Manufactures.

This grand classification is essentially one by industries. This fact must be recognized if the classification is to be continued. For this purpose it seems to me essential that strenuous efforts should be made to divide up that great body of laborers who are now classified under domestic and personal service, and place them under Agriculture, Trade and Transportation, or Manufactures, where doubtless the greater portion of them belong. This is probably a question of making the enumerators discard the title "laborer" and substitute for it a compound term, such as, agricultural laborer, railroad laborer, etc. There will doubtless be a residue of day or general laborers, which will still come under the class of domestic and personal service.

It seems to me also necessary that book-keepers, clerks, accountants, etc., should receive a subsidiary title designating the particular business in which they are employed. There would seem to be no particular difficulty in doing this. The distinction is already made between officials of trade and transportation companies and officials of manufacturing companies, and there seems to be no reason why the same thing should not be done for clerks.

This system would not prevent a classification according to the character of the work done, while it would make the grand grouping more precise.

In regard to the analysis the following remarks may be made.

(1) A great part of the analysis in the eleventh census is useless, because the age and sex constitution varies so in the different elements of the population that it vitiates all the comparisons.

(2) Comparisons of the number of persons in occupations from one decade to another, or in one section of the country compared with another, must probably be confined to large groups, such as railroad employees, cotton mill operatives, and the like, on account of the uncertainty of the minuter classifications.

(3) The analysis as a rule should confine itself to the discussion of specific questions, such as the employment of women and children, the presence of certain nationalities in certain industries, etc.

(4) The question in regard to unemployment by months might better be abandoned, and the analysis in regard to occupation and illiteracy, citizenship and ability to speak English, is of little consequence.

(5) The number of persons dependent upon the wage-earner in each branch of industry was not tabulated in

the eleventh census, although the facts were on the schedules and might easily have been brought out. It is hoped that the twelfth census will attempt this for at least the grand groups of occupations and the principal elements of the population.

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APPENDIX.

PREVIOUS CENSUSES IN THE UNITED STATES.

It is stated in the Eleventh Census,[1] that:

"Prior to 1850 no effort was made to obtain through the census enumerators detailed statements as to the occupations of the people, although in 1820 and again in 1840 the number of persons engaged in certain general classes of occupations was called for.

At the census of 1850 an inquiry was made on the population schedule as to the occupations of free males over 15 years of age, the printed results comprising 323 occupation designations in an alphabetical list, without classification according to the number engaged in each of the great classes, as agriculture, manufactures, and the like, and without any details as to their age or nationality.

Again in 1860 a similar alphabetical list of the occupations of free persons over 15 years of age, without distinction of sex, was printed in the report for that census, this list comprising 584 occupation designations but without classification or description of the persons so occupied.

At the census of 1870 occupations were tabulated for all persons 10 years of age and over, subdivided by sex, age and nationality, and classified under four general heads, namely: agriculture; professional and personal services; trade and transportation; and manufactures and mechanical and mining industries. The presentation of occupations in 1870 covered 338 occupation designations.

In 1880 the classification of occupations used in the census of 1870 was maintained, but the number of occupation designations was reduced to 265. Similarly, the subdivision by sex, age and principal nationalities was observed, but the number of separate nationalities was considerably less in 1880 than in 1870."

The report goes on to say:

"At the present census (1890) no radical departure was made from the general plan of classifying occupations adopted in 1870 and 1880, but several changes were made for various reasons, and the number of occupation designations still further reduced to 218."

If we turn now to the census of 1880,[2] we shall find that, while the occupations have not been changed to

[1] Population, 2: lxxv, f.

[2] Tenth Census 1: 708, quoting Ninth Census 1: 661.

any great extent the principle of classification in 1880 was radically different from that pursued in 1890. The plan in 1880, following that adopted in 1870, was "To refer every specification of occupation to some grand division of industry; and within each of such grand divisions to constitute as many distinct subdivisions as the nature of the material furnished by the enumerators would allow to be formed with a reasonable approach to completeness." The principle adopted here is that of classification by grand industries and not that of occupations which was followed in 1890. In fact the Superintendent avowedly rejected the system of expressing the employments of the people through a large number of minute and precise specifications, susceptible of being combined and re-combined successively according to different ideas or theories of classification. His reasons for this are that the subdivision of labor and the organization of industry in the United States really correspond rather to the larger classification than to the smaller, owing to the lack of division of labor; and, secondly, that the average enumerator is incapable of carrying out any body of instructions respecting the returns of occupations which require more than the plain and simple characterization of each main employment in the common phrase of the working people themselves.

In accordance with this plan the title "clerk" appears under the head of professional services, and also under the head of manufactures and mining, so far as the persons are employed in a purely clerical capacity in those branches of industry, while under the title of trade and transportation, clerks appear several times as "clerks in stores", "clerks in banks", "clerks in railroad offices", etc.

It thus appears that the census of 1890, for better or worse, made a radical departure from the principle of 1880.

In other respects the census of 1880 was peculiar, or at least different from that of 1890, inasmuch as Mining was put under the head of Manufactures. As the Superintendent remarks: "Mining is like Agriculture, in that it obtains the raw material of subsequent industrial processes and it is like Manufactures in that its agencies and forces are chiefly mechanical not chemical."[1] Which position is right may be doubtful, but in Europe the custom is to group it with Industry rather than with Agriculture. There seems to be less excuse for grouping Fisheries with Manufactures.

The returns of 1880 are analysed according to sex; by three groups of ages namely 10 to 15, 16 to 50, 50 and over; according to six nationalities; and distributed according to states and territories.

[1] Tenth Census, 1:708.

VITAL AND SOCIAL STATISTICS.

The Mortality Statistics of the Eleventh Census.

The vital statistics reports of the census have grown in unwieldy bulk and increased in tardiness more or less regularly with each successive census, until the reports for 1890 exceed in size those of any previous census, and the most important volume for the use of the majority of the state registration and sanitary services in this country[1] was not distributed until 1898, or nearly eight years after the end of the year for which the statistics were collected. As a result, much of the interest and value of these statistics have been lost. The accuracy and usefulness of these volumes are not in proportion to their size and to the length of time occupied in their preparation and publication.

Fundamental imperfections of the census statistics of mortality.—Ever since the first attempt to present mortality statistics in the seventh census (1850), the necessary unreliability of data collected by the method of enumeration, as contrasted with the proper method of immediate registration, has been thoroughly understood by the authorities in charge of the census. Nevertheless, the same blunder has been committed decade after decade in the framing of the census law, until to-day, after half a century has shown the impossibility of securing reliable statistics by this method, a census bill is before the House of Representatives for action, after passage by the Senate, which contains the same defective provisions. It may be questioned, in this matter of legislation for obtaining mortality statistics by the census,

[1]Eleventh Census. Vital and Social Statistics. Part I.

whether a blunder, after sufficiently long repetition, ever becomes a crime. Perhaps, if the mortality statistics of the census were presented sufficiently early to be of greater interest to sanitarians and to the public, and in a manner in which their bald imperfections would be more conspicuous, instead of being more or less concealed by the mass of secondary details, there would arise a more urgent public demand for better methods in this branch of the work.

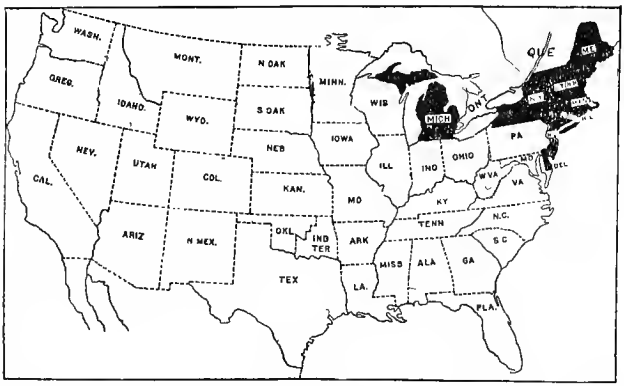
The only mortality statistics of reliable character presented by the census are those with whose *collection* the census had nothing to do. Even in the rates presented for the registration states, comprising only about one-third of the population of the country and about one-twenty-fifth of its area, there is no certainty that the same degree of accuracy of registration exists.[1] Some very misleading comparisons may be the result of imperfections of registration in some of the registration states and cities. The census ought to be able to verify the accuracy of its data in all cases, and for the non-registration states this is absolutely essential, if we are to know anything at all in a definite way in regard to their mortality.

I may be excused from proving the primary assumption that the first duty of a registration service, or of a census which deals with mortality statistics, is to supply reliable death rates. This is the first and fundamental requisite of a satisfactory sanitary service, and no elaboration of other ratios will excuse its absence. No one knows except by conjecture what the death rate of the United States is, nor can the relative prevalence of the important infectious diseases be satisfactorily determined from the census data.

[1][For evidence that this accuracy varies see below, 128, table.—W. F. W.]

Registration and non-registration areas.—The distinction between the registration and non-registration areas is so important, as affecting the validity of the census statistics of mortality, that it may be useful to insert a map showing the probable registration area

MAP SHOWING REGISTRATION AND NON-REGISTRATION STATES, 1898.



States having registration of deaths based on certificates of death and burial permits are black.

for the coming census. Since 1890, only two states have been added to this area, Maine in 1891, and Michigan in 1897, so that the prospect of improvement of the general mortality statistics of the census by the gradual extension of state registration, unless something is done to further such extension, would seem to be slight. The population represented by registration records in 1890 was 21,093,320, and that for which the statistics were obtained by enumeration was 41,528,930.[1] The statistics presented for the registration area are second-hand, that is to say, the census has simply made a somewhat more elaborate compilation of data which are already accessible to a large extent in the state and municipal reports. It is in the non-registration area that the col-

[1]Eleventh Census. Compendium, 2 ; 3. But compare *Idem*, Vital Statistics, 1 : 11.

lection of reliable mortality statistics is chiefly needed, and there the census ought to be able to perform the most valuable service, inasmuch as the public health officials of the non-registration states have now no reliable means of measuring the efficiency of sanitary work.

There has been retrogression in the accuracy of the statistics of the non-registration states in 1890, as compared with the preceding census. This is frankly admitted by the compilers of the census:

"This death rate [13.98 for the entire country] is lower than that given in the census of 1880, viz., 15.09, and higher than that given in the census of 1870, viz., 12.77. This does not indicate any actual change in the death rate, but rather that the enumerators' returns of the eleventh census are more deficient as regards the deaths than was the case in 1880." [1]

"The actual death rate for the non-registration area in 1880, as based upon the enumerators' returns, was 13.42 per 1,000 of population, while the same class of returns now give a rate of but 10.79 per 1,000; hence there must either have been a great increase in the healthfulness of the country or the enumerators' returns must be more incomplete as regards deaths than they were in 1880." [2]

So that the main purpose of these statistics of mortality, the determination of the variations of sanitary condition in the country, is not accomplished. It may be pertinent to inquire why, even if we can expect no improvement, the results obtained by the census of 1890 should not have been at least as good as in 1880.

Systematic neglect of non-registration states.—This falling off in the accuracy of the returns from the non-registration localities may be due, at least in part, to a tendency of the census authorities to give less attention to statistics known to be imperfect. There has even been, it would seem, a slight leaning toward a policy of coercion. In a paper by Mr. William A. King, chief of the division of vital statistics of the eleventh census, on the "Vital Statistics of the Census," it is stated:

[1] Eleventh Census. Compendium, 2:3.

[2] *Idem*, 4.

"A number of additional states, including Illinois, Indiana, Iowa, Michigan, Minnesota, Kansas and others, and numerous cities, have laws requiring the registration of deaths, and the data required concerning each death, run all the way from the full details furnished in Massachusetts and New York to the simple statement that John Smith, aged 57, died of 'heart failure.'

"It will thus be seen that if the clause, 'the data for which shall be obtained from the registration records of those states and municipalities possessing such records,' is construed as mandatory, and the question settled by the mere fact of the existence of a registration law, however inadequate, the value of the aggregate results would be little better than if the enumerators' returns were included. On the other hand, the exclusion of such records would, doubtless, soon lead to such amendment of existing laws and practical administration of the same as to warrant their subsequent adoption."[1]

The fallacy of this conclusion cannot be better shown than by the fact that of the many states left without adequate mortality statistics by the last and preceding censuses, only two, Maine and Michigan, have instituted systems of accurate registration during the last decade, and in their cases the neglect of the government was probably an insignificant factor in leading to the change. While the general government will certainly not be able to increase the number of registration states to any extent by overlooking their interests in the census, it is in its power, as I fully believe, by encouraging and fostering their efforts in the direction of reliable registration, and by giving them a suitable example, to increase very rapidly the registration area. Such work implies continuous effort and foresight in the central registration office.

It would have been well, indeed, if the census authorities had made a somewhat more careful study of the results obtained by the state registration systems. This would have avoided the serious mistake of including Alabama among the registration states, an error which appeared as late as the second volume of the Compen-

[1] Am. Stat. Assn. *Publications*. 5:214,f (1897).

dium published in 1894, but which was rectified in the final report.[1] The most casual examination of the Alabama law and of the annual reports based thereon would have shown that the mortality statistics of that state were among the most defective of any published by the non-registration states. The considerable number of returns made by state authority in such states as Michigan, Minnesota, Ohio and others, returns which were not far below those of the census in completeness, might have been utilized, and by properly supplementing them the results in those states might have been greatly improved. Finally, by consulting the state records, even when of an imperfect character, valuable information could have been obtained as to whether the data for the census year were fairly typical on not. This fault indeed, is common to all the deductions of the census, for registration as well as for non-registration states. A peculiarity in the epidemic prevalence of diseases in the particular year selected for the census would vitiate entirely all of the general conclusions regarding the changes in mortality. Exception must be made of the six large cities, whose data were studied for a six-year period ending at the time of the census; conclusions bases on these studies are much more reliable.

The elastic scale of proportional deaths.—Passing from the fundamental imperfections relating to the collection of the mortality data of the census, we may note in the presentation of the data collected a very serious fault and one which quite unfits the statistics of mortality for general reference by the practical sanitarian. I allude to the use, in the statement of mortality for the non-registration states, of proportional deaths, or deaths

[1] Compare the lists of registration states in Compendium, 2 : 3 (1894) and Vital Statistics, 1 : 10 (1896).

from a given cause per 1,000 deaths from known causes, to the entire exclusion of legitimate death rates.

These proportional deaths are the basis of most of the showy cartograms presented in the mortality reports of the tenth and eleventh censuses, and were, in fact, begun under the ninth census. They have never before been carried out quite so elaborately, however, as in the last census, and may be said to form quite a characteristic feature of these reports. Certainly, they are the feature to which the student of hygiene or health officer would first direct his attention in the examination of the census reports, and from which he would suppose himself able to draw valuable information as to the relative prevalence of diseases. They are, however, entirely unreliable, and even in many cases misleading.

The impropriety of making comparisons of mortality by means of a shifting or elastic scale ought to be evident without special discussion. The false conclusions which may be drawn may be readily seen by comparing two states, one of high and one of low general mortality.

Any given cause of death, *e. g.*, consumption, may be twice as fatal in proportion to population in the one state as in the other, yet if a sufficient excess of deaths from other causes occur in the state having an excessive mortality, the apparent ratio (proportional deaths) may be the same or even less in the state which really has the higher death rate. This source of error pervades the entire use of these ratios. As the size of the ratio is dependent upon two factors, directly, upon the number of deaths from any given disease and, inversely, upon the number of deaths from all diseases, it is evident that the relations of these factors must be thoroughly investigated before any dependence can be placed upon them. This is as much as to say that, for all ordinary practical

purposes, they are worthless, for the preliminary investigation of their validity is a difficult and tedious matter.

Other things being equal, these proportional rates may show the same variations as the actual death rates. Their unreliability comes from the uncertainty attending this proviso. If other things are not equal, a very considerable error may attend the use of these comparisons. The imperfections attending the employment of this method are, indeed, alluded to in the census, as follows:

"For the rest of the country [the non-registration states] the only rates which are of any value are those which can be obtained from the record of deaths alone, without reference to its completeness or to population, being such as the number of deaths due to a given cause per 1,000 deaths from all causes, or at a given age per 1,000 deaths at all ages, or combinations of these two ratios, with distinctions of color, sex, etc. Such rates, as is well known to statisticians, have little positive scientific value as compared with the ratios of deaths to population; nevertheless, they furnish some valuable information and suggestions, and are, therefore, given in this report to a considerable extent."[1]

It may be added that they also furnish much misinformation, and the suggestions to be derived from them are nearly as likely to be wrong as right. Why perpetuate, then, this pseudo-scientific system of alleged mortality rates, which have little in common with genuine death rates based upon population, but which are often mistaken for them in the attempted use of these census statistics by sanitarians? Death rates, although not accurate, would permit of the same relative comparisons, providing the accuracy of enumeration in different states was approximately the same. This ought to be true, and if not so, then the census ought to be able to determine what states or groups of states were fairly comparable. Morever, if the approximate amount of

[1] Eleventh Census. Vital statistics, 1:1.

correction were known, as could be readily determined by the collection of representative statistics from selected areas of each state, the comparability of the data would be greatly enhanced.

Misleading inferences from proportional "death rates."—As a concrete example of the misleading conclusions which are liable to be drawn from the employment of these seductive ratios, I may quote from the report of the Chicago department of health for July, 1897. Under the title, "Chicago as a Health Resort," a paper by Prof. John A. Robison, on the very important subject of the sanitarium treatment of consumption in home climates, is referred to as follows:

"With reference to pulmonary consumption, this is especially true of Chicago and the strip of territory lying along the western shore of Lake Michigan; and when this fact [greater healthfulness] substantiated by a sketch map and certain statistics from the eleventh national census, was pointed out to Dr. Robison, he at once recognized its importance as bearing upon his project. The substance of his paper is as follows: 'Several weeks ago, Dr. F. W. Reilly, assistant commissioner of health, handed me the subjoined map and called my attention to the fact that, contrary to popular belief, the death rate [proportional deaths] from pulmonary consumption was less, adjacent to the west shore of Lake Michigan than further inland. According to the census of 1890, the death rate [proportional deaths] along the lake shore was 84 per 1,000 [deaths], while twenty miles and more inland it was 124 per 1,000 [deaths]. . . What may be the explanation of this difference? One would naturally expect that the conditions for the increase of tuberculosis—such as overcrowding of the population, poor hygenic surroundings, poverty, poor food and filth—would cause a greater death rate in Chicago. Is the difference due to the greater prevalence of other contagious and infectious diseases, so that the relative lowness of the figures would be due to this factor, or are there climatic differences which make a residence contiguous to the lake more healthful? There may be a mathematical puzzle here, but we are inclined to think that the climate of the great lakes has been ignorantly maligned in the past.'"[1]

[1] Chicago Department of Health. Bureau and Division Reports, July, 1897, p. 4. Dr. Robison's paper was printed in *North American Practitioner*, July 1897.

Of course, the explanation suggested above, but not adopted, is probably the correct one. The high death rates in the lake cities from diarrheal diseases, etc., cause the proportional mortality from consumption to be unduly depressed. While the proportional deaths from consumption in the lake counties of Illinois (including Chicago) were only 89 per 1,000 deaths, as compared with 116 and 132 in the river and central counties respectively, the true death rates from consumption per 100,000 population in the lake, river and central counties were 212.4, 129.6, and 136.2, respectively—a very different showing. In the latter comparison the death rate for the lake counties is exclusive of the city of Chicago, thus eliminating the influence of more accurate registration in this group.

In attempting to make some use of the mortality statistics of the census for comparisons of my own state with other adjacent ones, the liability to such misleading conclusions was at once apparent, and the fact was recognized that the census statistics were practically worthless for such important sanitary purposes unless some means could be found of checking their aberrations. For this purpose a set of true death rates was calculated for the several state groups of Michigan, Indiana, Illinois, Ohio and Wisconsin, and their relations to the proportional deaths given by the census was found. A serious difficulty in the computation of these death rates, but one which would not have occurred if they had been properly presented by the census, is the elimination of registration cities from the non-registration states. No attempt has been made to take out any except the largest ones. The close relations between the variations of the two sets of figures thus obtained seem to negative the assumption of the census authorities that death

rates for non-registration states are worthless, because they are not complete. The relative indications of the death rates, in many cases correspond closely to those of proportional deaths, as "other things being equal," they should, and when discrepancies appear, I believe that the undue variation, in most cases, will be found on the side of the proportional deaths. Certainly, there is no reason why an enumeration conducted in exactly the same way over adjacent states, or even over the entire non-registration area, should not yield reasonably comparable results.

Ratios upon which no dependence can be placed until verified by elaborate calculations ought to have no place in an official report intended for general reference. However, not only have the misleading maps been retained, but a second series, based on the same erroneous principle, has been added, showing the proportional deaths for "grand groups" as well as "state groups." These will not embarrass the practiced statistician to any extent, for he will examine them with the full knowledge that for any exact conclusions they are not reliable, and will readily understand the apparent inconsistencies of the color distribution dependent upon the use of two different scales of color and two different units of area. The state of mind of a health officer or sanitary student, without special training in the devious ways of these peculiar statistics, may be imagined when he consults, *e. g.*, Map 19[1] and perceives from the shading that consumption is apparently more prevalent in the central counties of Michigan than in the lake counties (including the entire Upper Peninsula), while Map 20[2] represents the mortality of the

[1] Eleventh Census. Vital Statistics, 1 : Map 19, facing p. 324.

[2] *Idem.*, Map 20, p. 330.

entire state from consumption as approximately the same. Or scarlet fever may appear in one cartogram to be markedly more prevalent in the central counties,[1] and in the next cartogram[2] just the reverse. The explanation of these apparent discrepancies is, of course, very simple, but the fact that it has to be made unfits them for a report intended for general use. Vital statistics ought to be unambiguous in their indications.

Conclusions and recommendations.—These criticisms have confessedly covered a very small part of the census volumes, and have made no reference either to the subject of occupations of decedents, which has occupied a considerable part of the space given to vital statistics in the census, or to some other matters of importance. This is partly due to the fact that the work has been only very recently published, and, also to the fact, as shown above, that so much labor must be put into the reports in order to draw reliable conclusions that their use is practically prohibited. I believe, however, that the two most important respects in which improvement is desirable have been considered. These are: (1) Improvement in the collection of data; (2) Substitution of death rates, with some criterion of their approximate accuracy, for all proportional deaths in non-registration as well as registration states.

What is most needed to make the vital statistics of the census of sanitary use may be summarized as follows:

1. A permanent organization. Spasmodic efforts every ten years, wholly discontinued in the intervals, cannot achieve the best results. Continuous work is more

[1] *Idem.*, Map 2, facing p. 234.

[2] *Idem.*, Map 3, p. 236.

necessary for reliable vital statistics than for any other department of census work.

2. A closer relation between the census and state and municipal registration. The national bureau should exert a directive influence and promote the establishment of state registration offices on proper lines. Its influence in this respect in the past has been almost *nil.*

3. Prompt presentation of the data collected.

4. Exact knowledge of the accuracy of registration, by special investigation of selected representative districts in registration and non-registration states alike.

5. Study of the intercensal rates of registration states, cities, and also of those non-registration states having uniform records, in order that the epidemic or typical character of the census year may be known.

6. Use of death rates based upon population for all comparative purposes, with the entire discarding of unreliable methods of statement, such as proportional deaths. By the use of two or more colors upon a map, each having the usual gradations of shading, the different degrees of accuracy of registration could be defined, so that there would be no liability of comparing a rate in a non-registration state with one in a registration state. But reliable comparisons could undoubtedly be made in this manner of broad areas of the country.

7. Confinement of the reports to the most essential features of direct sanitary use, avoiding detailed studies of secondary character until, by the extension of the registration area, more reliable statistics are available.

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Mortality Statistics of the United States Census.

I. INACCURACY.

In no department has the census failed more signally than in the statistics of mortality. The radical difficulty consists in the fact that mortality statistics relate to a *period* of time, whereas the census is taken at a *point* of time. The census methods are fitted only to describe the state of the population on June 1st, not to record the changes in that population during the previous year. Births, deaths and marriages can properly be counted only when they occur, that is, through continuous registration. In the census they are counted by enumeration, that is, by inquiry of the census taker from house to house.

The earliest census in which mortality returns are given is the seventh (1850). The results are the subject of spicy comment in the census volume itself,[1] "Upon the subject of the Deaths no one can be deceived by the figures of the Census, since any attempt to reason from them would demonstrate a degree of vitality and healthfulness in the United States unparalleled in the annals of mankind, would overthrow the best established principles of statisticians, and, in coming down to details as well as in the aggregates, contradict all science and experience." The writer was too sanguine, however, as to the harmlessness of such inaccurate statistics. Experience shows that the census death rates are taken in earnest by hosts of guileless students. Indeed, much worse figures than those of the census of 1850 have been accepted without question. The death rate for whites

[1] Seventh Census, xl.

was given in 1850 as 13.6 per thousand; for slaves, 16.6. But the *Monthly Bulletin* of the Iowa state board of health for June, 1890, presents in perfect seriousness the following death rates: in 1880, 16 per 1,000; in 1883, 3.7; in 1885, 4.5; in 1890, 4.0. The death rate for Dubuque is given as 9.3, for Des Moines, 0.8, and for Council Bluffs, 0.06. These figures are commented upon as follows: "It was not till 1883 that the work of the state board of health began to be realized. The saving of lives, therefore, through the sanitary and protective measures of the state board, is a record to be proud of,"[1] the fact being, of course, that the worthlessness of its statistics is a record to be ashamed of. Inaccurate statistics, unless so labeled, are far worse than none at all. The label should be repeated wherever the figures occur. The tables of 1850, though admittedly incorrect, were thought by Mr. Kennedy to be of value "Should a more critical examination, which time will enable us to exercise, prove the returns of the number of deaths too small, such a result will not affect their value for the purposes of comparison of one portion of the country with another."[2] This optimistic remark is made in face of the fact that the figures show one death to every fifty-one living in Massachusetts, and only one to one hundred in neighboring Vermont!

In every census report the reader is warned against accepting the figures which follow, but the ordinary user of the census volumes will never think of hunting several hundred pages back of a figure to see if it is true or false. Thus, in one place in the Tenth Census,[3] the death rate for the United States is printed 15.09,

[1] Am. Stat. Assn. *Publications*, 2:152 (1890).

[2] Seventh Census. Report of Supt. for Dec. 1, 1852, and Dec. 1, 1851, p. 137.

[3] Tenth Census, 11:3.

although many pages back[1] this figure had been shown to be worthless and 18 is conjectured as the true rate. Why should false figures be given at all? The ordinary reader is certainly excusable if he expects a book of figures to be fact, not fiction. With successive censuses the returns have not improved, but rather degenerated. The official death rate for the United States in 1850 was 14 per 1,000, and in 1890 also 14. But the rate in 1890 was kept up by certain extraneous aids. Instead of trusting solely to enumeration, as in 1850, the censuses of 1880 and 1890 had recourse to the registration records of certain states and cities. Without these records, *i. e.*, within the non-registration area, the official death rate in 1890 was 11 instead of 14. Even another deduction must be made before we can compare this with the accuracy of the enumerators' work in 1850. In 1890, 40,000 deaths were added to the enumerators' record from the supplementary returns of physicians.[2] Without these deaths the official death rate would have been only 10. The character of the record for each census since vital statistics were first gathered is exhibited in the following table:

	Official Death Rate in U. S.	In the Non-Registration Area.	In ditto, but excluding Physicians' Returns.
1850	13.9	13.9	13.9
1860	12.5	12.5	12.5
1870	12.8	12.8	12.8
1880	15.1	13.4	12.0
1890	14.0	10.9	9.9

[1] *Idem.*, xix.

[2] This plan of soliciting corrections from physicians originated in the tenth census. Its extent, in both censuses, is indicated by the following table:

	1880	1890
Letters sent	70,000	75,000
Replies received	26,000	13,000
Deaths added	61,000	40,000

From the last column we see the steady deterioration in the accuracy of the enumerators' work, at least as applied to mortality statistics. Even the inclusion of the supplementary returns from physicians (middle column) did not keep up the last two censuses to the standard of 1850, while the substitution of registration for enumeration in a limited area barely brought them above that standard.

Of course it must not be forgotten that a death rate is the ratio between two numbers, the deaths and the population. An inaccuracy in the population would affect the death rate as truly as an inaccuracy in the number of deaths. The reason why the enumerated death rate in 1870 (3rd column) appears to better advantage than that of 1880 is, perhaps, that the count of population was worse in the former year, not that the count of deaths was better.

Another hindrance exists to making our American statistics comparable with European. The population number used as divisor ought to be, and in Europe is, a mean of the population through the year during which the deaths occur. The population at the middle of the year is usually taken. In the United States, however, that at the end of the year is taken. This population is too large and, in consequence, the resulting death rate is too small. The deficiency from this source amounts to from 1 to 2 per cent.

The above figures show the utter hopelessness of arriving at the general death rate in the United States by a method in which enumeration forms a part. Such a method has been discredited in other countries. The census of 1851 for Ireland attempted to give the

death rate for the preceding decennium by enumerators' inquiry, with the following result:[1]

1842	8.5	1847	34.8
1843	9.0	1848	29.7
1844	9.8	1849	35.1
1845	11.6	1850	24.5
1846	16.8	1851 (3 mos.)	7.0

As this table shows, the more remote the time, the more defective the record. Every event, even a death, is forgotten. Deaths of infants and females especially are overlooked after a certain time. Besides this, many families, especially those consisting of but one or two persons entirely disappear (either by death or emigration) leaving no one to tell the tale.

The same gradation is seen in our census. The deaths reported are less and less, the earlier in the year they come.[2]

If any further evidence of the dismal inaccuracy of the census figures for deaths were needed, it is to be found in a comparison of the results of registration and enumeration. In 1860 the enumerators found 21,300 deaths in Massachusetts; the registration showed 24,100.[3] The deficiency of enumeration compared with registration is here 12 per cent and the registration was doubtless itself defective. In 1870, Mr. E. B. Elliott, the government actuary, in computing his life tables, assumed from the registration of Massachusetts and England that the death rates were deficient in the census returns by 41 per cent.[4] In 1880, the enumerators' returns for Massachusetts (exclusive of Boston) were 27 per cent. short; for New Jersey 37 per cent. Even

[1] U. S. Eighth Census, Mortality and Miscellaneous Statistics, xxiv.
[2] Tenth Census II: xix.
[3] Eighth Census, Mortality and Miscellaneous Statistics, 213.
[4] Ninth Census, Vital Statistics, x.

after the enumerators' returns were supplemented by those from physicians, deficiencies still remained of 13 per cent and 20 per cent respectively.[1] A deficiency of 30 per cent as a maximum was allowed for the whole country. The final conclusion was that "It seems safe to assume that the death rate was not less than 17 nor more than 19 per 1,000 of living population."[2] Consequently the general rate was assumed as about 18. Comparing the registration area with the remainder of the country (where enumerators' and physicians' returns were employed) we find for the last two censuses:[3]

	1880	1890
Registration area	22.2	20.8
Non-registration area	13.4	10.9

We see here that registration gathers nearly twice as many deaths as the other method. It is only fair to add, however, that cities made up a larger proportion of the registration than the non-registration area, especially in 1880, and it is well known that urban mortality is high. But the death rate in the rural part alone of the registration states in 1890 was given as 15.7, and this is too small.[4] Infants' deaths especially escape enumeration (We shall see later that to a considerable degree they even escape registration). For 1890 the deaths under one year per 1,000 infants living under one year were reported as follows:[5]

Registration area	260
Non-registration area	76

In the eleventh census the death rates for separate states were not computed because misleading. In the twelfth

[1] Tenth Census, II: xix.

[2] *Ibid.*

[3] Eleventh Census, Mortality and Vital Statistics, I: 11. These figures differ from those given in Compendium, 2: 4. [For at least a partial explanation see above, p. 112,f.—W. F. W.]

[4] Eleventh Census, Vital Statistics, I: 11.

[5] Eleventh Census, Vital Statistics, I: 22.

census we hope no enumeration of deaths whatever will be attempted. Each census apologizes for inserting returns admittedly 20 per cent to 50 per cent short, on the ground that they are of use for the study of diseases which caused death, etc.; in particular for determining the comparative number of different diseases per 1,000 deaths from all causes. When this plea was first made (1850), there were no registration records, and the application of the death returns to such comparisons was probably a true utilization of an otherwise waste product. But in the eleventh census even this excuse for enumeration was of doubtful validity. Much better results were obtainable from registration methods. It is true that defective returns would give correctly the relative number of deaths from different diseases, if the percentage of deficiencies for each disease were uniform. But this is not the case. Each disease varies in frequency with the time of life. Croup predominates in childhood, cancer in advanced life, the diseases of child-birth between twenty and forty. Since the deficiencies of death returns vary with age, the resulting comparisons for diseases must necessarily be inaccurate. Moreover, as stated in the last census, "Such rates [the relative number of different diseases per 1000 deaths from all causes], as is well known to statisticians, have little positive value as compared with the ratio of deaths to population."[1] An epidemic of one disease causes the numbers of all other diseases per 1000 deaths to decrease, without any actual decrease of their frequency.

It must not, of course, be assumed that registration, in and of itself, is necessarily and always accurate. Much depends on the character of the registration laws, still more on the penalties for their violation, and most

[1] Eleventh Census, Vital Statistics, I : 1.

of all on the character of the officials who administer them. Through the kindness of various persons, chiefly secretaries of boards of health, the following rough estimates have been secured of the possible deficiencies in the death-returns of the registration states at the present time.

	Correct within
Maine	3 per cent
New Hampshire	1 "
Vermont	3 "
Massachusetts	1 "
Rhode Island	1 "
Connecticut	1 "
New York state[1]	5 "
New York city	1 "
New Jersey	1 "
Delaware	10 "
District of Columbia	1 "
Michigan	5 "

A few of those credited with a one per cent accuracy are probably deserving of a still closer estimate. For the registration states as a whole, it is probably safe to say that the deaths are reported correctly within two per cent or less.[2] The death *rate*, involving as it does the number of population, is probably correct within two or three per cent for the census year and within two to six per cent for intercensal years. The Census Office did not include within its "registration states" all states professing that name. Alabama claimed to have complete registration in 1890, but the registration death rate was only 13.8, as against a mere enumeration rate of 14.2 in 1880![3]

[1] Exclusive of New York city, Brooklyn, Yonkers, Albany and Buffalo.

[2] Similar estimates were secured for births and marriages. Birth returns are supposed to be deficient by 1 per cent in Rhode Island, 2 per cent in Vermont and Massachusetts, 3 per cent in Maine, and 5 to 25 per cent in the other states. Marriages range from 1 to 30 per cent.

[3] See W. A. King, Vital Statistics of the Census. In Am. Stat. Assn. *Publications*, 5: 214 (1897).

In one city in New York the death rate appeared as 13 per 1000. But on inquiry by Mr. Willcox it was found that a quarter or a third of the deaths escaped record, because of the failure to require burial permits before interment.[1] In a population sparser than forty to the square mile, complete registration is regarded as out of the question.[2] In any community the first years of registration do not give trustworthy results. Massachusetts has had registration since 1842, but the interesting "Vital Statistics of Massachusetts, 1856–95," begins with 1856 because the earlier records were thought to be of doubtful value. For the forty years, 1856–95, the records are regarded as "approximately correct."[3] Accuracy is everywhere a matter of growth. In England Farr estimated the probable deficiency in the registration of births for 1861–70 as one-sixth of one per cent, but for the period 1841–50 as three times as much.[4] The infant death rate is unreliable even under the most perfect system of registration. This is due to deficiency in the number of infants recorded in the population quite as truly as to deficiency in the number of deaths recorded. The deficiency in enumerated living infants is, in turn, partly due to the fact that infants 9 to 12 months old are returned as "one year old." This is true in all countries.[5]

One method of measuring such inaccuracy can be briefly described as follows: Take any particular year and make abstraction of migration; then the number born in that year, less those born and dying in it, is the

[1] *Idem.*, 5: 202.

[2] See C. L. Wilbur, *Idem.*, 191.

[3] Vital Statistics of Massachusetts, 1856–95, 714. In Mass. State Board of Health Reports, 1896.

[4] Farr, Vital Statistics, 523.

[5] Eleventh Census, Vital Statistics, I: 21.

number under one year old living at the end of the year. In Massachusetts, however, while the number of infants under one year old, thus computed, was found in 1890 to be 53,000, the number actually enumerated in the census was only 43,000![1] Adding to the 53,000 a supposed correction of 2 per cent. for deficiencies in the registration of births, we find the discrepancy still greater, or 26 per cent. Similar calculations in 1880 gave a discrepancy of only 5 per cent. Taking an interval of five years, in place of one year, we find in 1890 a deficiency of 14 per cent.; in 1880, of 3 per cent. These figures show the lamentable inaccuracy of the eleventh census, as well as the fact that even the tenth left much to be desired. This is seen by comparing the English deficiencies with those for America in 1880. In any population (especially in an increasing one, as in the United States) the numbers living between the ages 0–1 should exceed those 1–2; those 1–2 should exceed those 2–3; etc. But enumerators' statistics always show the opposite. Hence we have a rough measure of deficiency by subtracting the numbers returned as 0–1 from those returned as 1–2; those 1–2 from those 2–3; etc., and expressing the differences as percentages of the smaller numbers. The results are as follows:[2]

	Deficiencies (per cent).	
	U. S.	Eng. and Wales
Age 0–1 compared with 1–2	13	9
" 1–2 " " 2–3	13	3
" 2–3 " " 3–4	3	2
" 3–4 " " 4–5	1.4	0.7

Corresponding discrepancies exist for age divisions by months, especially in the eleventh census. The number returned as under one month was less than a seventh of

[1] Eleventh Census, Vital Statistics, I: 490.

[2] Tenth Census, 12: clvi.

those returned as from one to two months old.[1] The deficiencies vary for different sections and classes. Thus, for age 1–2 as compared with 2–3 the deficiencies were: whites, 13 per cent; colored, 18 per cent; native whites, 12½ per cent; foreign born, 35 per cent. For New York it was 16 per cent; Louisiana, 30 per cent; New Mexico, 46 per cent.[2] That is, enumeration of population encounters the worst obstacles among negroes and foreign born and in the sparsely settled west. Although the tenth census points out inaccuracies in infant mortality, it does not hesitate to make international comparisons. In the ninth census the government actuary, Mr. E. B. Elliott, gives a formula for correcting the irregularities in the returns for infants.[3]

II. LIMIT OF ACCURACY.

We must not make the mistake of classifying statistics into accurate and valuable, on the one hand, and inaccurate and valueless on the other. No measurements are truly accurate. The important thing is to know the degree of inaccuracy, or at least the direction of inaccuracy. To be sure that a figure is too high or too low is sometimes enough to make it of value. It becomes an upper or lower limit. If the negro death rate is known to be sadly deficient while the white death rate is nearly correct, the former will still be useful if, as given, it is greater than the latter; for then we are doubly sure that the true negro mortality exceeds the white. Even the early Greek computation that the sun was at least 19 times as far away as the moon was a real addition to knowledge, though the true number is about 400.

[1] Eleventh Census, Compendium, 3: 198.
[2] Tenth Census, 12: clvi.
[3] Ninth Census. Vital Statistics, 1: 517,ff.

When both an upper and a lower limit can be given we are much better off. The estimate that the general death rate in the United States was, in 1880, between 17 and 19 per 1000,[1] placed it above that of Norway and below that of Italy. In almost every case, some estimate can be given of the amount and direction of possible error. The bane of ordinary "Statistics" is the omission of this estimate. Where the errors are large, they should be given in footnotes accompanying the table. Where they are less than 5 per cent, they can be sufficiently indicated by printing only the significant figures (and ciphers as needed).

The importance of stopping at the last significant figure is not yet recognized among statisticians. The very phrase is strange to most of them. Its meaning will appear from a few examples. The official population of the United States on June 1, 1890, was 62,622,250. A very intelligent gentleman expressed surprise when told that this figure was not correct to the units place. If it were correct, it would be the most accurate measurement ever accomplished. No chemist's balances, no astronomer's calculations have ever yet reached a precision of one part in sixty million. The most accurate physical measurements are correct only to one part in a hundred thousand to a million, *i. e.*, require only six significant figures, and this extreme degree of accuracy is quite out of the question in statistics. Not more than three significant figures could possibly be claimed for the population count (62,600,000) and, probably, two are amply sufficient[2] (63,000,000). Few statistics are reliable beyond two and few are useful beyond three significant figures. We should prac-

[1] Tenth Census, II: xix.

[2] Cf. Am. Stat. Assn. *Publications*, 4: 99 (1894–95).

tically confine ourselves, therefore, to a choice between two and three. Where the second figure is certain and the third uncertain within only a few units (say three), three places should be used; in case of greater uncertainty, two. If the uncertainty amounts to say 5 per cent or more, the method of a separate upper and lower limit should be employed.

Few people realize the need of these rules in statistics, the extent to which useless figures are tacked on, and the false appearance of precision given to the most hypothetical calculations. The gold in the United States on July 1, 1896, was officially estimated at $599,597,964. This result was found by guessing at the gold in 1873 as twenty millions and applying the subsequent reported imports, exports, recoinage and consumption. The final result is worthless beyond one significant figure.[1] Such official computations appear to be based on the theory that a sum is as accurate as the most accurate of its parts. The truth is that a sum cannot be more accurate than the *least* accurate of its parts.

Another important principle is that to multiply or divide a figure by a constant cannot improve its degree of accuracy. A writer on the Spanish dollar[2], translating from one unit to another, brings out of an original four place figure the result that the Castilian mark contained 230.0465 metric grams. As the coin in question related to the period of the discovery of America, and as even our modern mints can scarcely attain such a degree of accuracy, the non-significant character of the last three figures is apparent.

Index numbers are often expressed with four or five digits when not more than two have meaning.[3]

[1] Yale Review, 7 : 105 (1898).
[2] Am. Hist. R., July, 1898, p. 607.
[3] Cf. A. L. Bowley, *Economic Journal*, 5 : 374, (1895.)

In the special field of mortality statistics, examples of false accuracy abound. In an article on Vital Statistics of an Apache Indian Community[1] we find a death rate of 142.58. This is based on a population of 371 and on 53 deaths! The colored death rate in Rochester is elaborately tabulated in the eleventh census as follows:[2]

All ages	6.92
Under five	21.28
Five years and over	5.65

These figures are based on a colored population of 578 and on 4 deaths! This fact is stated below the table, but only in the reading matter and, apparently, because the results are so peculiar. Of course such statistics have no significant figures at all. They should be omitted. The same is true, as already shown, of the general death rate in the United States (15.09).

Intercensal rates are less accurate than those of the census year, for the population must be guessed at ("estimated") on the basis of the previous rate of increase. In England, in the census year 1891, the estimated population was found to be 2½ per cent. in excess.[3] Such an error invalidates even the third significant figure (whether of population or of death rate based thereon). In the United States the probable errors in such estimates are much greater.

Statisticians have juggled with death rates by assuming a great increase of population. Thus in St. Paul,

[1] Am. Stat. Assn. *Publications*, 3: 427 (1893).

[2] Eleventh Census, Vital Statistics, 2: 44.

[3] The English have it in their power to improve their estimates by adopting a different method, viz., to add to the last census number the intervening births and immigrants, and subtract the deaths and emigrants. By this method, Dr. Longstaff calculated the population in 1891 correctly to *four* significant figures. Unfortunately this method can not be used in the United States. See Cannan, "Demographic Statistics of the United Kingdom; their want of Correlation and other Defects." In Royal Statistical Society, *Journal*, 61: 50 (1898).

1896, by estimating the population as 216,000, as against 155,000 in 1894, a death rate of 6.7 was presented as against 10.1 in 1894.[1]

III. DEATH RATES.

Though the desired statements as to accuracy are lacking, there can be no doubt that, in general, the registration portions of the census volumes on vital statistics are of much value. The last two censuses are the only ones which have made any considerable use of state and municipal records. Indeed it is only in recent years that these records have been available in sufficient quantity and quality. In the tenth census two volumes were devoted to vital statistics; in the eleventh, four, (of about 1100 pages each). Vol. I treats of general analysis and rate tables, vol. II of the vital statistics of cities of 100,000 and upward, and vols. III and IV of the detailed statistics of deaths by locality, etc., the raw material, as it were, of the previous volumes. Besides these there are three special volumes on the cities of New York and Brooklyn, Boston and Philadelphia, and Washington and Baltimore, which are, however, practically included in one of the above four. They cover about 1000 pages in all. A large portion of these seven volumes is devoted to registration matter, and this is not simply transcribed from the state and municipal reports. It often happened that many items returned on the original cards were not entered in the printed or even manuscript reports of the separate states or cities. In such cases the census directed a thorough examination of the original cards. Thus, the census report, though derived from

[1] Am. Stat. Assn. *Publications*, 5: 362 (1897).

anterior state and municipal sources, contains much which is not to be found there or elsewhere.

In the tenth census the registration states were Massachusetts, New Jersey and the District of Columbia. The "registration area" consisted of these states and 19 cities in other states. In the eleventh census the "registration area" consisted of the registration states, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, and the District of Columbia, and of 83 cities in the non-registration states with "fairly satisfactory systems of registration." The total number of cities included was 271, of which 28 had a population of 100,000 or more, viz.: New York, Chicago, Philadelphia, Brooklyn, St. Louis, Boston, Baltimore, San Francisco, Cincinnati, Cleveland, Buffalo, New Orleans, Pittsburgh, Washington, Detroit, Milwaukee, Newark, Minneapolis, Jersey city, Louisville, Omaha, Rochester, St. Paul, Kansas city (Missouri), Providence, Denver, Indianapolis, Allegheny. In the twelfth census the number of registration states will be increased by Maine and Michigan and possibly others, the most likely being: Maryland, Indiana, Iowa, and Pennsylvania.

The death rates (including still births) in the registration states were as follows:[1]

Vermont	16.3
Delaware	18.4
New Hampshire	18.8
Connecticut	19.4
Massachusetts	20.2
New York	20.5
New Jersey	21.0
Rhode Island	21.9
District of Columbia	25.9
Total Registration States	20.4
Total Registration Area	20.8

[1] Eleventh Census, Vital Statistics, I: 10.

The registration area contained a population of 21,000,000.

In the registration states, the urban death rate was given as 23.5 (supposed to be nearly accurate) and the rural 15.7 (supposed to be too low, the actual rate being, say, 16).[1] The rate varies directly with the size of the city as the following table shows:[2]

Cities.	Males.	Females.
Under 10,000	19.2	16.9
10,000– 15,000	19.3	17.2
15,000– 25,000	21.2	18,7
25,000– 50,000	23.2	20.4
50,000–100,000	23.7	20.9
100,000 and over	25.1	21.5

Since size corresponds usually to density, this table agrees with the observations of Farr in England.[3]

Number of Districts.	Persons per square mile.	Death rate.
54	170	15 to 17
349	200	18 to 20
142	450	21 to 23
56	2,200	24 to 26
16	6,900	27 to 30
1	12,000	32
1	66,000	37

The statistics for cities[4] over 100,000 show, in 1890, an average mortality (exclusive of still births) of 21.6. The highest record is for Newark (27.4), with New York second (26.5), followed by Jersey city and Brooklyn. The lowest is Omaha (9.4), for which the record is probably defective. The death rates in the 28 largest cities in United States, England and Germany, in 1890 were:[5]

United States	21.6
England	21.4
Germany	23.1

[1] Eleventh Census, Vital Statistics, I: 11.
[2] Eleventh Census, Vital Statistics, I: 220.
[3] Farr, Vital Statistics, 126.
[4] Eleventh Census, Vital Statistics, II: 2.
[5] *Ibid.*

Remembering that the American rate is too small (owing to the use of the population at the end of the year instead of the middle, and to some deficiency in the record), it may fairly be said that the death rate for large cities is the same in this country as in England and Central Europe. The death rate of Paris in 1890 was 24.5, and of Vienna, 24.6. In Russia and Italy larger rates are found: St. Petersburg, 28.4; Rome, 33.4; Moscow, 40.3. The rate for Havana is said to be from 70 to 140!

The true rate for the United States as a whole is supposed to be about 18. But this appears to be a mere repetition of the surmise of 1880.[1] It is not likely that the rate in 1890 should be the same as in 1880. In every country in Europe, except Norway, the rate in 1890 was less than in 1880. On the other hand, in the registration states common to the two censuses we find an increase:[2]

	Massachusetts.		New Jersey.	
	Males.	Females.	Males.	Females.
1880	19.1	18.1	17.0	15.7
1890	20.9	19.4	22.3	19.7

This increase is probably due to an increasing proportion of urban population (and in part to greater accuracy in registration).

As is seen above, the female death rate is less than the male. This was found in 1890 to be the case in every registration state except Vermont. For the registration states taken together, the results are: males, 21.5; females, 19.3. The excess of male mortality is well known in Europe. The higher death rate for males compensates for the higher birth rate. In a stationary population, according to the English laws of mortality and natality, the sexes would be evenly distributed. There would be 512 male births for every 488 female

[1] Eleventh Census, Vital Statistics, I: 11.

[2] Eleventh Census, Vital Statistics, I: 13.

and these would sustain a population of 20,430 males and 20,430 females.[1]

The poor have a much heavier death rate than the rich. Châteauneuf, comparing the rich with the poor quarters of Paris, found the following mortality :[2]

Age.	Rich.	Poor.
30–35	0.85	1.4
40–45	0.85	1.9
50–55	1.8	2.6
70–75	6.8	14.1

Similar contrasts result from the returns of industrial insurance (exclusively among the poor) compared with ordinary insurance. The following table of mortality is given by the Vice-President of the Metropolitan Life Insurance Company (industrial) :[3]

Age.	Ordinary Insurance. (English Experience.)	Industrial. (Metropolitan.)
20	7.3	10.5
25	7.8	14.1
35	9.3	17.2
55	21.7	35.2
70	64.9	91.0

Like conclusions are reached by inspecting the death rate chart for separate wards of New York.[4] That the upper classes live longer than the average is also pointed out in the *Journal of the Royal Statistical Society*.[5]

The mortality among the colored population is very heavy. The eleventh census showed for the registration area the following results for different ages :[6]

	Under 5.	5–15	15–45	45–65	65 and over
White	64	5.4	9.3	22	78
Colored	124	10.4	17.0	33	106

[1] Farr, Vital Statistics, 485.

[2] A. Quetelet, Physique sociale, I : 361.

[3] The Charities Review, March, 1898, p. 33.

[4] Eleventh Census, Vital Statistics of New York and Brooklyn, 164, 250.

[5] 50 : 649.

[6] Eleventh Census, Vital Statistics, I : 19.

In ten southern cities the white death rate is 20.1 and the colored, 32.6.[1] We must remember, however, that the deficiency in the population returns is greater among the colored than among the whites, especially in infancy. Yet the general facts as to the relative mortality between the two races in the United States cannot be doubted, and are abundantly confirmed by Hoffman's monograph[2] and by the experience of Insurance Companies.[3] The death rates by nativity in registration states in 1890 were as follows:[4]

Native whites of native parents	17.0
Native whites of foreign parents	24.4
Foreign born whites	19.9
Colored	19.6

These figures, however, are not comparable owing to differences in age distribution.

Mortality varies with age. It is greatest in infancy and old age and least in childhood. In the registration area we find the death rates per 1000 to be as follows:[5]

Under 1.	Under 5.	5 to 15.	15 to 45.	45 to 65.	65 and over.
206	67	5.6	9.7	22	79

Infant mortality is the subject of special study. It also presents special difficulties. Not only are the returns of infant deaths deficient, but the returns of infant population, on which death rates must be computed, are also deficient. On account of such deficiencies, special modes of reckoning infant mortality have been adopted. For instance, the deaths of infants under one year old occurring during a year are compared, not

[1] F. L. Hoffman, Race Traits and Tendencies of the American Negro, 39.

[2] *Op cit., passim.*

[3] Am. Stat. Assn., *Publications*, 3 : 350 (1893).

[4] Eleventh Census, Compendium, II : 4.

[5] Eleventh Census, Vital Statistics, I : 15.

with the population living under one year old, but with the births registered during the year.

In the United States, however, this method is not regarded as accurate because of the inaccuracy in the registration of births.[1] Another method, not of great value, but adopted in the census, is to compare the deaths of infants under one year old with the total deaths.[2]

Still births are often included in the birth and death rates. They are sufficiently numerous to make a difference in the second significant figure. In reckoning the infant death rate especially, still births make an enormous difference. Thus, in the registration area for 1890 we find the number of deaths under one year per 1000 births is:[3]

Including still births	221
Excluding still births	183

A very little consideration will show that still births should not be included in births and deaths. They represent antenatal deaths, and should be studied in connection with antenatal population. Ideal vital statistics should begin with conception, not with birth. In such statistics room would be found for miscarriages and still births. Since, practically, such statistics are out of the question, the proper mode of treating still births is as a separate category.

IV. "CORRECTED" DEATH RATES.

Few cautions are more necessary to the student of vital statistics than to beware of the disturbances of age distribution. The foreign born population of the

[1] Eleventh Census, Vital Statistics, II: 30.

[2] Eleventh Census, Vital Statistics, I: 22.

[3] Eleventh Census, Vital Statistics, I: 21.

United States have had to suffer unjustly in statistical comparisons from disregard of this caution. Their criminality, for instance, appears high simply because of the small number of children and old men, and the large number living at the intervening or "criminal" ages. Similarly the longevity of men of note (such as Gladstone and Bismarck) is often interpreted to mean that distinction and heavy responsibilities lengthen life. But men of note are *ipso facto* old to start with, while obscure persons are largely made up of the comparatively young.

Sometimes a rough correction for age distribution is given by excluding certain ages from the comparisons altogether. Thus, Thomas A. Welton, in treating of "Local Death Rates in England and Wales, 1881–1890," attempts to show that "between the ages 5–45 and particularly between the ages 15–35, such an impression is made upon death rates by migration and by casual events that, for the purpose of measuring the strength of the force operating for and against life, the facts for those ages should be left out of account, and attention should be concentrated on statistics as to ages 0–5 and 45 upwards."[1] Similarly the birth rate is often reckoned in relation to the female population of "child-bearing age," *i. e.*, 15–50,[2] and the mortality among different occupations compared by confining attention to ages over fifteen. But such crude methods are often inadequate. Thus, in 1890 the death rate among "professional" men over fifteen was 15.7 and among the "manufacturing" class 13.0, indicating, apparently, a greater vitality

[1] Royal Statistical Society *Journal*, 60:33. Summarized in Am. Stat. Assn. *Publications*, 5 : 363, (1897).

[2] *E.g.*, Eleventh Census, Vital Statistics, II : 32.

among the latter. But a minuter comparison, for different age groups, shows the opposite:[1]

	15–25.	25–45.	45–65.	65 and over
Professional	5.0	8.5	19.1	79
Manufacturing	5.0	9.2	20.1	78

Great masses of the mortality statistics in relation to occupation given in the census volumes are, therefore, of no value. A still more striking example may be drawn from the mortality of different conjugal conditions. In 1890, in 22 cities, the death rate among males over 15 was: single, 13.7; married, 19.4,—an apparent argument for the single state. But a little consideration shows that the married are generally older than the single. The misleading character of the preceding comparison can be exposed by using only two age groups:[2]

	15–45.	45 and over.
Single	11.7	52
Married	11.4	34

In the same way it is found that though the frequency of marriages is greater among spinsters than widows yet for each age group taken separately, the opposite is true.[3] Even when the correction for age distribution does not reverse the conclusion, it is important in affecting its force. Thus, the average mortality among whites in New York for six years was 26.7, and among colored, 28.8,[4] which contrast is much less than usual (*e. g.*, for the registration area, white, 20.2; colored, 32.4). The reason for the small difference in the rates for the metropolitan area is the presence of so many adult colored waiters and servants, and the comparative absence of infants. Again, the urban death rate, though usually greater than the rural, would be still greater if the two

[1] Eleventh Census, Vital Statistics, I: 65.
[2] Eleventh Census, Vital Statistics, II: 52–54.
[3] R. Mayo-Smith, Statistics and Sociology, 109,f.
[4] Eleventh Census, Vital Statistics, I: 30.

populations were similarly constituted as to age. Thus, for England:[1]

	Death Rate.	
	Uncorrected.	Corrected.
City	24	24
Country	19	16

Where the direction of the error arising out of unlike age distributions is subject to conjecture, the comparison is rendered worthless. This is true of the following comparisons, giving the death rates (in the rural parts of the registration states) according to birthplace of mother.[2]

Mother born in	Death rate.
United States	11.7
England and Wales	14.4
Germany	12.9
Italy	10.2

A "corrected" or "refined" death rate is based on an assumed standard age distribution. It is the death rate which would exist in the given population if its age distribution conformed to that standard. Suppose, for instance, we wish to compare the mortality of French and English children. An actual population group of 10,000 of each is found. Let us assume that in the English group 400 die per annum and in the French only 235. The English crude death rate is therefore 40 per 1000 and the French 23.5. But the two groups are very differently constituted, viz.:

	English.		French.	
Ages.	Population.	Deaths.	Population.	Deaths.
0 to 5	5000	350	1000	100
5 to 10	5000	50	9000	135
	10,000	400	10,000	235

Whereas the English children are equally divided be-

[1] Mayo-Smith, Statistics and Sociology, 151, f.

[2] Eleventh Census, Vital Statistics, I: 36.

tween the two age groups, the French have nine times as many in the upper age group as in the lower. Consequently among the English the younger deaths predominate; among the French the older. For the age group 0–5 the English death rate is 350 per 5000, or 70 per 1000; for the French the corresponding rate is 100 per 1000. For the ages 5–10 the English rate is 50 per 5000, or 10 per 1000; the French, 135 per 9000, or 15 per 1000. That is, in both cases, the French rates are *higher*, viz:

Ages.	Death Rates per 1000. English.	French.
0 to 5	70	100
5 to 10	10	15

The crude rates for the two nationalities were thus misleading. We are to seek a refined rate on the basis of *similar age distribution.* Let us, for instance, take the English age distribution as standard and find out what the French death rate *would* be with a similar distribution (half in each age class):

	French.				
Ages.	Assumed Age Distribution.		Known Death Rates.		Deaths.
0 to 5	5000	×	100 per 1000	=	500
5 to 10	5000	×	15 per 1000	=	75
	10,000				575

There would have been 500 deaths in the first class and 75 in the second. The total is 575 for an assumed population of 10,000, or 57.5 per 1000. This is the refined French death rate made comparable with the 40 per 1000 for the English, and is, as it obviously ought to be, the greater. We may, equally well, take the French age distribution as standard and assimilate the English to it.

This would give for England a refined death rate of 16 per 1000 to be compared with the French 23.5 per 1000; or, we may assimilate both populations to some third standard. Let us assume, as such a standard, two age classes in the ratio of 2 to 3, or 4000 to 6000:

ENGLISH.

Ages.	Standard Distribution.		Known Death Rate.		Deaths.
0 to 5	4000	×	70 per 1000	=	280
5 to 10	6000	×	10 per 1000	=	60
	10,000				340

FRENCH.

Ages.	Standard Distribution.		Known Death Rate.		Deaths.
0 to 5	4000	×	100 per 1000	=	400
5 to 10	6000	×	15 per 1000	=	90
	10,000				490

This gives an English rate of 34 per 1000, and a French rate of 49 per 1000.

For purposes of international comparison it matters little which standard is taken. In the first case (English standard) the French death rate exceeds the English by 44 per cent., in the second (French standard) by 47 per cent., and in the third (arbitrary standard) by 44 per cent. In actual practice the standard chosen for age distribution is of even less consequence than in this imaginary case. For the purpose of comparing the mortality in the different nations of Europe, the age distribution of Sweden has been adopted as standard. The average age constitution of Europe has also been taken. The results of the two standards usually agree within one-half of one per cent.[1] Dr. Josef von Körösi, of

[1] Am. Stat. Assn. *Publications*, 3: 457 (1893). The age groups should be so contrived as to distribute properly the ages ending in 0 or 5. A great number of persons return their ages only in round numbers. Compare above p. 57,f.

Budapest, has emphasized, more than any other writer, the importance of correcting the crude death rate. He had, however, been anticipated by Dr. Ogle in England and Dr. Koch in Germany (Hamburg), and still earlier by Dr. Jarvis, of Dorchester, Mass. Ogle proposed 12 age groups, viz.: each year up to 5, 5 to 10, then each ten years to 60, and lastly 60 and over. Körösi showed that four age groups were enough, viz.: 0–1, 1–20, 20–50, 50 and over. The results of the two calculations differ usually about one per cent. The International Institute of Statistics, meeting at Berne in 1895, recommended five age groups and the Swedish population as the standard. Thus:

Age Groups.	Swedish Population in each 100.
0–1	2.6
1–20	39.8
20–40	27.0
40–60	19.2
60–	11.5

The census has made little use of refined death rates. In the eleventh census the subject was referred to with disfavor: "In the large cities of the United States a correction of gross death rates for peculiarities of race distribution of the population of each city would be much more important than the above correction for age distribution, but it seems hardly worth while to try to indicate the relative healthfulness of different cities by rates for the total population only, and the phrase 'corrected rates' must always be more or less misleading;"[1]

It is scarcely an argument against eliminating one source of error, that another source is more important. Nor is it certain that race distribution is more important than age distribution. It may seem so because, in our cities, different races have different age distributions.

[1] Eleventh Census, Vital Statistics, II: 30.

The true view would seem to be that age, sex and race distributions should all be considered. Different problems require different elements to be eliminated. A death rate corrected for age distribution is only one of many death rates of importance to the statistician. In pressing the claims of a refined rate it is not pretended that even crude rates have no value. For instance, to estimate the rate of increase of a population the birth rate is to be compared with the crude death rate.

The importance of a refined rate is especially great in America, for the age distributions of our various population groups are widely diverse. Thus, we find:[1]

	Death Rate.	
	Gross.	Corrected.
Denver	24.2	31.0
San Francisco	23.6	29.9
Omaha	10.0	14.7

The results of correction may, of course, be in either direction. Thus, Chas. E. Burnap, writing on "Mortality in Twenty-Three Massachusetts Cities,"[2] finds:

	Death Rate.	
	Recorded.	Corrected.
Boston	24.6	26.0
Worcester	19.4	19.4
Salem	20.6	19.8

V. AVERAGE LIFE-TIMES.

All the systems of weighting hitherto described, by which a corrected death rate is obtained as an average of

[1] Eleventh Census, Vital Statistics, II: 30. The correction is according to the Berne recommendations.

[2] Am. Stat. Assn. *Publications*, 5. 82 (1896). The method employed by Burnap is a variation of the method described above. He first compares, say, Boston with Massachusetts in general by taking the Boston age distribution as standard. Next Worcester is compared with Massachusetts by the Worcester standard, and Salem by the Salem standard. Having thus effected comparisons between each city and Massachusetts, these cities are compared with each other.

the death rates at separate ages, are quite empirical and arbitrary. But the rational student will crave a more rational system. The theoretically true corrected death rate is based on an age distribution, given in the nature of things, not the Swedish, not the average of Europe, but that of an ideal stationary population.[1] This true corrected death rate has the important property that it is the reciprocal of the average duration of life. Death rates and length of life are thus opposite facets of the same fact. Mortality measures vitality.

In England, statistics for a period of 35 years showed an average crude death rate of 22.4 per 1000; the true corrected rate was 24.5, *i. e.*, $\frac{24.5}{1000}$.* This shows an average life time of $\frac{1000}{24.5}$ or about 41 years.

The connection between death rate and life time is so important that the following outline demonstration of their relation is given:

Suppose,

100 persons born daily, and that
99 survive one day,
85 survive one year,
70 survive ten years,
50 survive forty years,

and so on, until all are dead. Such a table is called a table of survivors, or a life table.

Suppose, for convenience, that each day's births (and deaths too) occur at the beginning of that day. It is evident that on any one day the population must consist, and consist solely, of

[1] Cf. Farr, Vital Statistics, 121.

* *Ibid.*, 124.

the 100 persons just born,
the 99 persons survived from yesterday's 100 births,
the 85 persons survived from the 100 births one year ago to-day,
the 70 persons survived from the 100 births ten years ago to-day,
the 50 persons survived from the 100 births forty years ago to-day.

This is an age distribution table. Its necessary numerical identity with the survivorship table is apparent. In actual populations, however, the two tables are different except, perhaps, in France, which has a nearly stationary population. We suppose each table to be completely filled out, down to successive days, and not with gaps as above. Evidently the sum totals of the two tables are equal. Suppose this total to be 15,000,000. The total of the age distribution table is clearly the total population. This is, therefore, 15,000,000 and remains constant. Hence, the daily deaths must equal the births (100). The death rate each day is therefore $\frac{100}{15000000}$.

Next, we observe that the sum total of the survivorship table is the total number of days lived by the 100 persons born on any one date; for they each enjoy one day's life or 100 days together. Then 99 are left, who all live a second day or 99 days together, and so on, making 15,000,000 days in all. The average life time of the 100 persons is therefore $\frac{15000000}{100}$ days. Thus the reciprocal relation between average life time $\frac{15000000}{100}$ and true corrected death rate, $\frac{100}{15000000}$, is apparent. The relation remains intact if the life time is reduced to years instead of days and the death rate to a yearly instead of a daily rate; for these changes merely introduce 365 as divisor and multiplier.

To correct the death rate, then, in a community of abnormal age constitution, we make it normal by sup-

posing it to be fed by a constant number of births. The death rate which would exist if the population were thus kept stationary is the true corrected death rate. To obtain it in any community we need a table of survivorship.

Since such death rate is interchangeable with the mean duration of life, it will be convenient to pass to the latter conception.

The mean duration of life, in most civilized countries, is between 35 and 50 years (corresponding to a true corrected death rate of between 25 and 20 per mille). Thus:

Norway (1856–65)------- 47 years,	France (1877–81)-- 41 years,
England (1881–90)------ 44 years,	Belgium (1841–50)- 37 years,
United States (1830–60)-- 42 years,	Prussia (Becker)-- 37 years.

The mean life time is on the increase.

England,[1] (1838–54)---39.9	France,[2] (1856–65)---------- 39
" (1871–80)---41.4	" (1877–81) (males)-- 41
" (1881–90)---43.7	

Life tables for Sweden show an increase of fifteen years since the middle of the last century. The city vitality especially has improved. The mean lifetime in Stockholm, 1755–63, was only 16 years.

In Massachusetts the death rate has remained stationary for four decades:[3]

1856–65	19.4	1876–85	19.4
1866–75	19.6	1886–95	19.6

This, however, is due to an increase in urban population. The death rate in both city and country has declined.[4]

[1]Vital Statistics of Massachusetts, 1856–95, 815. In Mass. State Board of Health Reports, 1896.

[2]Levasseur, Tables of Mortality and Survivorship. In Royal Statistical Society *Journal*, 50: 547 (1887). Translated from *Journal de la Société de Statistique de Paris*, March, 1887.

[3]Vital Statistics of Massachusetts, 1856–95, 743.

[4]*Idem.*, 748, f. The opinion that American vitality is declining appears to be based on a wrong method of estimating mean life time, viz., by taking the average age of the dying. Such methods seem to

The gravitation of population towards cities tends throughout the world towards increasing mortality, while improved sanitation, and medical knowledge and skill tend directly opposite. The magnitude of the latter forces is, therefore, understated in any comparison between old and new mortality which does not distinguish between city and country.

The steady improvement of vitality is also apparent from the following condensed tables of survivorship for the Netherlands, Sweden and France:[1]

NETHERLANDS.

Age.	Baumhauer. 1840–51.	Von Pesch. 1870–80.
0	1000	1000
10	644	654
60	310	357

That is, out of each 1000 persons born, 47 more now survive to be 60 years old, than 30 years ago.[2]

SWEDEN.

Age.	Wargentin. 1757–63.	De Berg. 1861–70.
0	1000	1000
10	611	737
60	293	401

In Sweden, 108 more persons out of each 1000 now survive to 60, than a century ago. The infant mortality was reduced one-half in the same period.[3]

FRANCE.

Age.	St. Maur. Before 1750.	Demonferrard. 1817–32.	Bertillon. 1856–65.
0	1000	1000	1000
10	484	668	681
60	168	365	389

vitiate the conclusions of John Stockton-Hough, Statistics relating to the Births, Deaths, Marriages, in Philadelphia, 1861–72. Social Science Assn. of Phila., 1874, p. 14,ff. For the fallacies of the method, see Farr, Vital Statistics, 475,ff.

[1] Levasseur, Royal Statistical Society, *Journal*, 50 : 558 (1887).

[2] Levasseur, *Ibid.*, 555.

[3] Levasseur, *Ibid.*, 553.

Here, in about 75 years, 197 more persons were preserved to age 60 than previously. In the next 35 years the saving was 24. The rate of improvement is thus decreasing.

The improvement is so marked that even crude death rates are sufficiently exact to show it strongly. In London, in the latter half of the 17th century, the death rate was about 80 per 1000 and in the 18th century it was about 50, while in the middle of the present century it was 24.[1]

In the 18th century the death rate in Boston varied (1725–74) between 33 and 43, averaging 37.[2] To-day it is about 25.

The effect of improvements in medical science and sanitation is well illustrated by the disappearance of sudden jumps in the death rate through epidemics. In London, in the plague years 1593, 1625, 1636, 1665, the death rates per 1000 were 240, 310, 130, 430.[3]

The introduction of a filter, in 1893, into the water supply of Lawrence, Massachusetts, was followed by an immediate reduction in the deaths from typhoid fever.[4]

Years.	Death Rate from Typhoid Fever.
1887	1.2
1888	1.2
1889	1.4
1890	1.3
1891	1.2
1892	1.1
1893	.87
1894	.50
1895	.31
1896	.19

[1] Farr, Vital Statistics, 131.

[2] Bills of Mortality, 1810–49, City of Boston, Reprinted for Registry Department, 1893.

[3] Farr, Vital Statistics, 131.

[4] Mass. State Board of Health Report, 1896, 568.

The introduction of sewerage and house drainage was followed in ten cities by a reduction of 69 per cent in the death rate from typhoid fever.[1]

The general death rate in New York city in 1896, when Colonel Waring had charge of the street cleaning, was 21.5. The lowest annual rate in the preceding decade was 22.8 and the average, 25.2.[2]

It was found in Massachusetts that while infectious diseases had grown less deadly between the period 1875–84 and 1885–94, local diseases had grown more so, leaving the total mortality about the same.[3]

The life time in city is less than in country. Contrast *e. g.*[4]

Surrey, males	44	Massachusetts and New Jersey	45
Liverpool, males	25	New York city	33

Male life time is less than female.[5]

	Male.	Female.
England, (1876-80)	42	45
United States	41.0	42.9
New Jersey, 6 years	40.1	43.6

The mean life time is also called (rather infelicitously) the expectation of life at birth. The expectation of life may be taken at other times than birth. It is then called the mean after-life-time. Just as the mean life-time is the reciprocal of the true corrected death rate, so the mean after-life-time, for any particular age, is the reciprocal of the true corrected death rate for that portion of the population over that particular age. At successive ages the mean after-life in England and America for a half century ago is given in the following table:

[1] Forum, 26: 540 (1899).

[2] New York City Health Dep't. Report, 1896, p. 14.

[3] Vital Statistics of Massachusetts, 1856–95, 812.

[4] Farr, Vital Statistics, 454. Eleventh Census, Vital Statistics, I: 484.

[5] N. A. Humphreys, in Royal Statistical Society *Journal*, 46: 212 (1883).

Age.	Mean After Life (Males). England (Farr). 1838–54.	United States (Meech). 1830–60.
0	40	41
10	47	48
20	39	41
30	33	34
40	26	28
50	20	21
60	14	15
70	8	9
80	5	5

English and American mortality were thus nearly identical.

It will be noticed that the expectation of life does not always decline with advancing years. In infancy the reverse is the case, on account of the heavy mortality of that period. When the expectation does fall off, each year's advance of age reduces the expectation by less than a year. The advance in age and the reduction in expectation could only be equal if, within that year of age, there were no mortality whatever. A short rule for finding the expectation of life for any age between 20 and 45 is to expect to live beyond that age half way to age 96. For ages over 45, the expectation is half way to age 90.[1]

We have seen that the mean life-time has increased within the last half century. This has not been true of all the mean after-life-times. The effect of improved medical skill has been to prolong some weak lives, but only enough to shorten the average of survivors in general. Thus:

Age.	England.[2] 1838–54.	1881–90.
0	39.9	43.7
20	39.5	40.3
40	26.1	25.4
60	13.5	12.9
80	4.9	4.5

[1] Walford, Insurance Guide and Hand Book, 162.

[2] Vital Statistics of Massachusetts, 1856–95, 815.

Out of 100 aged 10 years, 66 used to survive to age 30; now 89 survive to that age. But 52 used to survive to age 60, and now only 51.[1]

In Massachusetts the death rates per different age-classes in 1865 and 1895 were:[2]

Ages	5–9	10–14	15–19	20–29	30–39	40–49	50–59	60–69	70–79	80–
1865	9.6	5.1	9.6	12.6	11.7	12.	17.	33	70	168
1895	6.2	3.2	5.3	7.1	9.7	13.	20.	39	82	185

It will be observed that for ages less than 40 the mortality for each age-class has fallen during the thirty years; but for higher ages, it has risen. It would be interesting to know the facts for urban and rural populations separately.

It has been claimed, in fact, that the effect of medical science is only to decrease infant mortality, to lengthen children's lives a little. But Humphreys has shown that for England two-thirds of the increased life is between the ages 20 and 60, that is during active life.[3]

A magnitude somewhat different from the expectation of life is the so-called probable after-life. It is not the most probable after-life, but that after-life which is as likely to be reached as not. To find it we take a survivorship table and mark that point in it at which just half of the original number are still living. Thus, if out of 1000 born, 500 will survive to age 45, the probable life for persons just born is 45. If, out of the 500 living at 45, 250 survive to age 70, the probable after-life for persons 45 years old is 25 years.

[1] Royal Statistical Society, *Journal*, 50: 649.

[2] Vital Statistics of Massachusetts, 1856–95, 755.

[3] Royal Statistical Society, *Journal*, 46: 213.

The expectation of life and the probable life for insured males in the United States are :[1]

Age.	Expectation.	Probable Life.
10	50	55
30	36	38
60	15	14

VI. LIFE TABLES.

Tables of survivorship or life tables are essential to the calculation of mean life times and true corrected death rates and, of course, to the work of the insurance actuary. They afford to the statistician the most powerful instrument he can have for the study of mortality, and should be regarded as the very kernel of mortality statistics.

The earliest attempt to discover a law for human vitality appears to be that of Ulpian, a Roman Praetorian Praefect, about 220 A.D. The meaning of his table is somewhat doubtful, but it is assumed to refer to expectation of life :[2]

Age.	Expectation of Life.
0–20	30
20–25	28
25–30	25
30–35	22
35–40	20
40–41	19[3]
49–50	10
50–55	9
55–60	7
60–	5

The Tuscan government is said to have authorized the use of Ulpian's table for valuing life annuities as late as 1814.[4]

[1] Meech, System and Tables of Life Insurance, p. *2.

[2] Walford, Insurance Guide and Handbook. 154.

[3] Between ages 40 and 50 the expectation decreases one year for each year of age. This could only be true, if there were no deaths between these ages. The table cannot, therefore, be accurate. (See last section, page 155).

[4] Assurance Magazine, 6 : 314, note.

Graunt gave a table of survivorship based upon infererences from the burials in London between 1640 and 1660:[1]

Age.	Survivors.	Age.	Survivors.
0	100	46	10
6	64	56	6
16	40	66	3
26	25	76	1
36	16		

This was probably more conjecture than statistics.

Halley was the first to construct a life table of value in 1693, though Jean de Wit in Holland had, 22 years previously, provided a method of constructing such a table. Halley's table was based on the births and deaths of the city of Breslau, 1687–91, and deaths of the parish of Christ Church. After its publication there was great speculation in tontines. The first insurance company of importance, the Amicable, was started in 1706. Simpson continued Halley's work in 1742. Later Price constructed his Northampton and Carlisle tables. The former was based on deaths alone and the latter had too few data to be reliable. In 1766 Wargentin produced the first national table (Swedish). The best early tables are:[2]

Age.	Halley. 1687–91.	French; St. Maur. Before 1750.	Swedish; Wargentin. 1757–63.	Süssmilch. Before 1775.
0	1000	1000	1000	1000
10	661	484	611	532
20	598	449	570	491
40	445	314	459	374
60	242	168	293	210
80	41	23	56	37

Price constructed a table for Stockholm (1755–63) from which the following expectations of life were derived:[3]

[1] Walford, *Idem*, 154.

[2] Levasseur, in Royal Statistical Society *Journal*, 50 : 554.

[3] Walford, *Idem*, 155.

	Males.	Females.
0	14	18
5	31	37
10	30	37
20	24	30
40	16	19
60	9	10
75	4	4

The following tables are among the best for the last half of the 19th century. They relate to males:[1]

AGES.	0	5	10	20	40	60	80
Norway (Kiaer)	500	401	386	367	311	233	70
Denmark (David)	500	383	362	343	293	200	44
Sweden (Berg)	500	377	361	344	284	179	30
Switzerland (Gisi)	500	354	345	331	285	198	30
United States (Meech)	500	363	346	327	267	189	56
England (Farr)	500	361	345	326	265	178	40
France (Bertillon)	500	348	334	316	264	190	42
Belgium (Quetelet)	500	357	341	315	251	168	34
Prussia (Becker)	500	329	313	298	248	163	29
Italy (Bodio)	500	315	297	280	235	161	32
Bavaria (Hermann)	500	285	271	255	205	135	22

We note here important differences in the mortality of different nations, though a striking similarity in the main features. The United States and England are closely similar except at the later ages. The Scandinavian countries are in the lead, followed by those of Central Europe and America. Southern Europe (Italy) has low vitality.

The best general life table for the United States is probably that by Meech. It is based on the population returns for the censuses of 1830, 1840, 1850 and 1860, not on mortality statistics. It is not published in the census, having been prepared too late for the census of 1850, with which Mr. Meech was connected. Mr. Meech was not successful in inducing subsequent census super-

[1] M. Block, Traité de Statistique, 216; Bodio, Annualità Vitalizie, (Rome, 1892,) 2; Meech, System and Tables of Life Insurance, 258.

intendents to continue the calculations. The first census table was constructed by Elliott, government actuary, for the census of 1870. It can scarcely be accurate, being based on an assumed deficiency in the mortality record of 41 per cent. and being subject to much arbitrary adjustment. Its results, compared with those of Meech, are as follows:

	Expectation of Life.		
	Elliott.	Meech.	
Age.		Male.	Female.
0	39.	41.	43.
10	45.	48.	49.
40	26.	28.	29.

The Tenth Census was rich in life tables relating to the registration states and cities. Some were as follows:

	Expectation of Life. (White Males).			
	Massachusetts.	New Jersey.	Dist. of Columbia.	N. Y. city
0	44	46	41	33
10	51	52	47	45
40	29	29	26	24

About seventy sets of tables in all are presented in this census accompanied with interesting diagrams. Indeed the census was too prodigal as to quantity and somewhat careless as to quality. It is difficult to separate the wheat from the chaff. The tables should have been accompanied by a running criticism. A general defect was that no attempt was made to correct the deficiencies in the returns for infants. This correction is essential to a good life table.

The Eleventh Census devotes only three pages to life tables. One for New Jersey, based on six-years' records, gives expectations of life (for white males) as follows:

Ages.	Expectation.
0	40
10	49
40	27

The corresponding figures, from Meech, for the whole United States, 1830–60, are 41, 48, 28. The agreement

is closer than with the New Jersey table of 1880 (46, 52, 29), due perhaps to progressive precision in New Jersey registration. The population data were used as reported, though for Massachusetts and New Jersey additional tables were computed, in which the population under 15 years was adjusted by a formula given by Mr. Elliott, in the census of 1870. "Owing to the marked deficiency in the population data for children under 1 year of age . . these life tables were even more inaccurate than those given in volume xii of the Tenth Census Reports, and the same must, therefore, be said of the expectation of life derived from them. The deficiency in the return of children under 1 year of age was so great that the omission assumed by Mr. Elliott as the basis of his formula in 1870 is entirely inadequate."[1]

Tables are given for the census year for Massachusetts, District of Columbia, Chicago, and Cincinnati, and for six years for New Jersey, Baltimore, Brooklyn, New York city, and Philadelphia.

Life tables are the basis of life insurance, but the tables employed by insurance companies to-day are constructed entirely from experience with insured lives. These are, of course, subject to medical selection. The expectations of life at age 40, for insured lives at different times, are as follows:[2]

French Tontines, Deparcieux, (1746)	27
French Tontines, Beauvisage, (1867)	29
French Ins. lives, Kertanguy, (1874)	27
French Pensioned Widows	29
Twenty English Companies, Males, (1869)	27
Twenty English Companies, Females, (1869)	28
English Gov't Pensions, Males	26
English Gov't Pensions, Females	30
German Gotha Company, (1880)	27
Thirty American Offices, Males	28

[1] Eleventh Census, Vital Statistics, I: 484.

[2] Levasseur, in Royal Statistical Society *Journal*, 50: 565 (1887).

These figures do not differ greatly from those derived from general mortality tables. The expectation of life at age 40 from the English Life Table Number 3, (1838–54), quoted above, is 26, and from the English table (1876–80) also 26; for the United States (1830–60) according to Meech, 28.

Selection among insured lives is not wholly in favor of the company. Those who elect to withdraw from a company are not a random collection, but consist largely of healthy lives. The unhealthy are almost sure to remain. Companies which charge a natural premium or assessment instead of a level one, are especially liable to this sort of adverse selection. The natural premium increases yearly. The level remains the same, so that as time goes on and the chances of death increase, the premium becomes progressively cheaper in proportion to the risk, and the insured has a stronger economic motive not to withdraw. For lack of precautions against withdrawals of their best risks, many companies have become bankrupt. In all companies, the mortality among lives recently insured is less than the tables allow, while among lives insured longer, the reverse is true. Thus, among 17 American offices the ratios of actual mortality to that computed from the tables were :[1]

For those insured one year or less	61 per cent
For those insured from five to six years	140 "

A corresponding study in England, made by Mr. E. Farren,[2] showed the following death rates per 1000:

Age.	General Population.	Insured Lives.	Insured only one year.
30	10.2	8.7	6.6
70	67.	63.	54.

[1] Emory McClintoch, (N. Y. Mutual Life), Effects of Selection, (New York, 1892), 31.

[2] Farr, Vital Statistics, 483.

Thus the influence of selection is in favor of the company at first and against it later on, while its general effect is to bring the mortality of insured lives only slightly below that of the general population.

The importance of selection in insurance is not yet appreciated by the companies. It belies the boasted precision of the actuary's calculation of risks. The time must come when its effect will have to be considered in calculating premiums. This will vastly complicate the actuary's work for, instead of relying on a single life table, he must have recourse to a separate life table for those insured at each age of life.

Some policies confine their holders to certain territories or latitudes. The wisdom of this restriction is seen by comparing the ordinary experience table with one constructed by Mr. C. N. Jones for American tropical experience:[1]

Age.	American Experience. 30 Offices.	Tropical Experience.
20	1000	1000
40	858	767
60	635	460
80	173	56

Statistics collected by Meikle, in England, and McClintock, in America, show greater longevity among abstainers from alcoholic beverages than among non-abstainers.

If the survivors opposite any age in a life table be deducted from the survivors of the year previous, the difference will be the numbers dying in the intervening year. A table of such differences is a mortality table. It is interchangeable with the survivorship table, since either can be obtained from the other. A complete set of life tables requires many columns besides the three thus far mentioned (survivors, dying, expectation of life).

[1] Meech, System and Tables, p. *2; Papers and Transactions Actuarial Society of America, No. 11, 1898, p. 316.

Sometimes as many as eleven columns are given and these do not include the "commutation tables" of the actuary, which involve the interest element.

The law of human mortality (or the equivalent law of survivorship) has usually been treated empirically. Exponential formulae have been fitted to it by Gompertz, Makeham, and others. Lexis, however, queried why it should not conform to the law of chance as, for instance, do the heights or weights of men. He observed that if the law of mortality be plotted graphically, the curve resembles, at the old age end, the curve of the law of chance. Recently Karl Pearson has shown that the entire mortality curve can be accounted for by adding together five chance curves.[1] The importance of this contribution to the subject lies in the fact that it rids it of its purely empirical character, and co-ordinates the law of human mortality with the law of the distribution of human heights, cranial capacity, and other measureable characteristics, as well as with the laws of lottery drawing, coin tossing, and games of chance. One curious point brought out by Pearson, is that the conformity of the mortality law with the law of chance is possible only by including ante-natal deaths. We must begin our observations at the beginning (conception), not after seven to ten months of life have passed.

The methods of constructing life tables can only be briefly mentioned here. It will not do simply to take statistics of, say 100,000 deaths, and record how many of the persons thus registered died 1 year old, 2 years old, etc. Such a table would not be a true table of survivorship, except in a stationary population. In an increasing population there is always an abnormal number of

[1] Chances of Death, and other Studies in Evolution, (London; Arnold), Vol. I, p. 26.

children and hence an abnormal number of children's deaths each year. Statistics of deaths in such a population would thus be overloaded with short lives. The mean duration of life calculated from such a table (*i. e.*, the "average age of the dying") would be too small. Dr. Price's Northampton table is an example of such an error. The mean duration of life was 25. Dr. Farr found for a later period the same mean life for Northampton, computed by the same (erroneous) method, but the true method gave 38![1]

If a population is stationary, however, statistics of death are sufficient to establish a life table. This method was used by Halley. As we have seen, statistics of age distribution in such a population would also give a life table. In practice, however, no stationary populations exist. The age distribution at successive censuses in a moving population (together with the total numbers) will suffice to determine a life table. This method is employed by Meech.

The best tables, however, are those constructed from the death rates for each age group. Knowing the death rate for the age group, 5–6, it is possible to compute how many out of a given number living at age 5 will survive to age 6. Beginning at age 0 (with any arbitrary number such as 100,000) the survivors can be recorded for each successive year to the end. The details of the method have been improved by numerous writers, including Fourier, Quetelet, Bertillon, Farr, Knapp, etc.

VII. SUGGESTIONS.

In closing this very rapid survey of the field of mortality statistics in the United States, the following recommendations for the twelfth census suggest themselves:

[1] Farr, Vital Statistics, 480.

1. Omit enumeration of deaths entirely. The resulting "statistics" are not only useless but mischievous. They cast discredit on the census as a whole. They increase its cost and occupy valuable space. Their collection and analysis absorb attention which would otherwise be free to prepare the really valuable features of the census.

2. Accompany every figure subject to doubt with a statement as to its possible or probable error, such notes to be attached to the tables and figures by reference stars or letters.

3. Dispense with all digits not really significant.

4. Calculate rates on basis of population at center of year.

5. Make more use of corrected death rates.

6. Make more use of life tables, but only where they can be accurately computed.

7. Give prominence to age distribution tables in connection with life tables, using solid diagrams such as Bodio's.[1]

8. Make the census of 1900 a Jubilee census and review critically all the mortality statistics of value (not great in amount) in the United States, official and unofficial, with a briefer historical review of the best work abroad.

9. Insert short catch titles for the tables, and in general make tables of contents and indexes more usable.

A more radical recommendation is to establish a national system of registration of births, marriages and deaths. This need not pretend at first, to be complete but only representative.[2] Certain areas may be selected for national registration in the south, west, etc., and

[1] Annali di Statistica, 12: 16,ff., (1880).

[2] C. L. Wilbur, in Am. Stat. Assn. *Publications*, 5 188 (1897).

the results compared with state registrations in the east. As Dr. Wilbur says, in meteorology we establish selected stations of observation. We do not attempt to record all the weather. Attempts at completeness are apt to ruin accuracy. There will almost certainly be some bad figures to contaminate the good. An essential feature of Dr. Wilbur's plan would be to empower the registrar to reject returns shown to be seriously defective.

VIII. LITERATURE.

The following list is by no means a complete bibliography. To enumerate all that has been written on mortality statistics (even excluding their application to life insurance) would require many hundred pages. The writings noted below are merely a few of such as would be most useful to the American student and would put him on the track of earlier and collateral references. Among important writers omitted are De Wit, Halley ,Süssmilch, De Parcieux, Price, Tetens, De Moivre, Fourier, La Place, Baily, Milne, Moser, De Morgan, Becker, Wittstein, Gompertz, Makeham, Bodio, Körösi, Billings.

United States Census Volumes, beginning with 1850. Only those of 1880 and 1890 are of much value.

Annual reports of the National, state, and municipal boards of health, especially those of Massachusetts.

A Summary of the Vital Statistics of the New England States for the year 1892, (Boston, Damrell & Upham), by the secretaries of the state boards of health.

The Vital Statistics of Massachusetts, 1856–95 (in Twenty-Eighth Annual Report of State Board of Health of Massachusetts for 1896), by S. W. Abbott, Secretary.

Bills of Mortality, 1810–1849, City of Boston, by Lemuel Shattuck, Boston (Registry Department), 1893, xliv, 87 pp.

Monthly Bulletin of Vital Statistics of Connecticut, New York, Michigan, and other states.

Publications of the American Public Health Association.

Publications of the American Statistical Association, especially 1892–3.

Race Traits and Tendencies of the American Negro, by F. L. Hoffman. In Publications of the American Economic Association, 1896.

Publications of the American Society of Actuaries.

The Probabilities of the Duration of Human Life in the United States, Am. Philos. Soc., Philadelphia, Vol. III, p. 25, 1st Series, 1791. Wm. Barton.

Philadelphia Life Tables, Am. Philos. Soc. of Philadelphia, 1870, p. 17. By P. E. Chase.

Social Science Association of Philadelphia, 1879. Stockton-Hough on "Statistics of Births, Deaths, Marriages, etc., in Philadelphia, 1861–72," and "Relative Influence of City and Country Life," etc.

System and Tables of Life Insurance, by Levi W. Meech.

Statistics and Sociology, by Richmond Mayo-Smith, New York, 1895.

Reports of the Registrar of Vital Statistics of England and other countries.

Journal of the Royal Statistical Society: *e.g.*, "Value of Death Rates," December, 1874, by Humphreys; "Decline in English Death Rate," 1883, by Humphreys; "Tables of Mortality and Survivorship," by Levasseur, March, 1887; "Summary of Several Male Life Tables," 1887, by Ogle.

Journal of the Institute of Actuaries, *e.g.*, "Contributions to the History of Life Insurance," 1850; "Construction of Life Tables," 1861, by Farr.

Text-book of the Institute of Actuaries.

Insurance Guide and Handbook, by C. Walford, 2d Edition, 1867.

New Life Table of Glasgow, by H. Chalmers.

English Life Table, by Wm. Farr. (This is the best life table extant).

Vital Statistics, by Wm. Farr, London, 1885.

Elements of Vital Statistics, by A. Newsholme, London, 1889.

Studies in Statistics, by G. B. Longstaff, London, 1891.

The Chances of Death, etc., by Karl Pearson, London, 1897.

Bulletin de l'Institut International de Statistique.

Journal de la Société de Statistique de Paris, *e.g.*, "Diverses manières de mesurer la vie humaine," March, 1886, by Bertillon.

Allgemeines statistisches Archiv.

Annales de Demographie Internationale.

Annualita vitalizie, Rome.

Annali di Statistica, Rome.
Ueber die Ermittlung der Sterblichkeit, etc., 1868, by G. F. Knapp.
Abhandlungen aus der mathematischen Statistik, Leipzig, 1869, by G. Zeuner.
Physique sociale, by Ad. Quetelet.
Tables de mortalité et leur developpement, 1872, by Quetelet.
Einleitung in die Theorie der Bevölkerungsstatistik, Strassburg, 1875, by W. Lexis.
Traité theorique et pratique de statistique, Paris, 1878, by M. Block.
Die Lehre von der Mortalität und Morbilität, Jena, 1882, by H. Westergaard.
Die mittlere Lebensdauer, Jena, 1893, by L. von Bortkewitsch.
Statistik und Gesellschaftslehre, 1895–7, by G. von Mayr.

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Statistics of Crime in the United States Census.

I. Statistics of Crime prior to 1890.
II. Census of 1890.
III. General criticism of Census Statistics of Crime.
IV. Propositions for Twelfth Census.

I.

The United States census of 1890 devotes the greater part of the volumes entitled Crime, Pauperism and Benevolence, to the statistics of prisoners. The designation statistics of crime is not so exact as the term statistics of prisoners, but may be considered authorized by its use in the census volumes.

No statistics of crime or prisons appear in the census before that of the year 1850, which marked the beginning of modern methods in census taking.

The population schedule for 1850 contains as its last rubric the question whether the person enumerated was deaf and dumb, blind, insane, idiotic, a pauper, or a convict.[1] The instructions went so far as to say that enumerators should strive to find out, though *not* by direct questioning, whether any person not an inmate of a penal institution at the time of the census, had been convicted of crime during the year, and if so to return him as a convict.[2] Furthermore the census definition of "family" indicates clearly that penal institutions constituted a family in the census use of the term.

Clearly then the population schedule of 1850, which was substantially repeated in 1860 and 1870, offered an opportunity for statistics at least of prisoners. The

[1] Seventh Census. xii.

[2] *Idem*, xxii.

return of convicts at large must of necessity have been defective, as the question was not suitable for a census schedule. But the statistics of institution families could have been separated from the remainder of the population in such a way as to furnish a study of the personal characteristics of the inmates of correctional institutions, as well as of other categories of institutions. Such statistics would have comprehended only such items of statistical information as were available for the population at large, since none of the special characteristics of this population group were asked—crime for which committed, sentence, etc. None the less these statistics of personal characteristics derivable from the population schedule were not tabulated by the census authorities.

Such statistics of prisoners as we possess prior to the year 1880 were derived from another source, the schedule of Social Statistics.[1] This related to a variety of subjects and was essentially a locality schedule. Among its questions was one as to the number of prisoners in the place. But instructions as to what constituted a prisoner are lacking. The question was capable of several interpretations. It might apply only to penitentiaries or might include also the county jails and houses of correction. It might include only persons convicted of crime, or all inmates of penal institutions, among whom those awaiting trial are a considerable fraction. The number of prisoners reported by the census in 1850 and 1860 is small, and the subsequent census volumes admit that historical comparisons prior to 1880 are worthless.[2] In 1870 the statistics of prisoners were gathered by the same means as in the preceding census, though there seems to have been greater care exercised

[1] *Idem*, xii.

[2] Eleventh Census. Crime, Pauperism and Benevolence, 1 : 126.

in the enumerations required by the schedule of Social Statistics. The superintendent devoted considerable attention to this Social Schedule and issued definite instructions as to the interpretation of its headings. In connection with prisoners we learn that inmates of workhouses (houses of correction) were not to be included. But the schedule remained merely a summary of the number, without guarantees for its proper filling out. The writer is informed, however, of one instance in which the report for an entire state was a mere guess, and believes it to be the opinion of those well informed on the subject, that the entire enumeration was exceeding slipshod.

The figures furnished by the censuses of 1850, 1860 and 1870 are merely statements of the total number of prisoners by geographical divisions. In the form in which the information was gathered, there could be no study of details.

With the census of 1880 we find a great improvement. The facts relating to prisoners were gathered individually. The schedule contained not only the data required for the population as a whole, of which the prisoners form a part, but also specific data relating to cause of incarceration, and in the case of conviction, the nature of the offence and the duration of sentence. A considerable part of the volume entitled Defective Dependent and Delinquent Classes is devoted to the analysis of the figures and to the tables relating to crime. For the first time we find in the census the study of a population group of criminals in their various demographic and social characteristics.

II.

With the census of 1890 the statistics of prisoners underwent a considerable enlargement. The special schedule for this class[1] contained not only as before the questions of the general population schedule, which were more numerous than in 1880, and the special questions of 1880, but a number of questions relating to social and industrial matters not found in the general enumeration. Of this nature were questions concerning occupation in prison, degree of industrial education, employment at time of arrest, advanced education, residence in or out of the state, health and use of alcoholic liquors.

Thanks to the use of the electrical tabulating machine the utilization of the data contained in the schedules is remarkably complete. The tables are in this respect probably unique. Nowhere does the writer know of a fuller analysis of a population group. In the volume devoted to general tables[2] as many as 511 pages are given to the statistics of prisoners.

If we attempt a critical examination of these volumes, it is not in a captious spirit, but solely in the hope of pointing out errors to be avoided in the future. It is the more necessary to emphasize this, as the need of brevity forces us to confine our remarks to what seem to us the errors of the volume.

The volume of general tables is open to the following criticisms:

a. The tabulation is at times wasteful and without purpose.

b. The tabulation is defective, differing in grouping from that of the general population.

[1] For questions asked on this schedule, see Eleventh Census, Crime, Pauperism and Benevolence, 1 : 1, footnote a.

[2] *Idem*, Part 2.

c. Much of the tabulation is often superfluous, as in the case of the data given in the general census and in the statistics of prisoners, it is more elaborate in the latter.

d. The tabulation relates to superfluous data, in that corresponding inquiries were not made at all in the general census of population.

a. To some persons the entire volume has appeared to be an example of wasteful tabulation. It has been pointed out that to devote five hundred and eleven pages of tables to eighty thousand persons is a disproportionate allotment of space compared with that given to the population in general. This criticism is hardly just in view of the high social interest which attaches to prisoners as a class. It is only justifiable in part, on the supposition that the extreme elaboration of the figures relating to prisoners would interfere with or prevent the proper tabulation of data of still greater social interest. In view of the generous appropriations made for the eleventh census it would be difficult to trace any such effect. In any general organization of the statistics of a country considerations as to the relative urgency and importance of different inquiries must receive due attention.

In some cases it would appear that there has not been a due regard for economy of space, but the most important defect is the printing of long tables of comparatively little significance. Thus Table 49 gives double, triple and quadruple crimes by states.[1] It records 3,367 facts, occupies 432 columns and 28 pages of printed matter. Of these columns ten only contain in excess of 25 cases; 43 only in excess of 5 cases; the remainder relating generally to one case. The fact that such and such a combination of crimes is represented once in the prisons

[1] *Idem*, 2 : 216–243.

of the United States, and that it is found in a certain state is not of sufficient importance to warrant its separate tabulation. This matter is carried still further in Table 53, comprising 20 pages, which gives the various combinations of charges, a cross-reference table.[1] The fact that the analysis in the introduction contains no mention of these tables beyond a mere naming of them is perhaps sufficient evidence that they elucidate no question of interest.

Another table gives occupations in prisons by groups of crime.[2] Concerning the value of such a tabulation, it is only necessary to quote from the introductory analysis: "the foregoing table has been inserted in order to complete the text according to the method adopted for the entire report, but the occupations of prisoners under sentence have little relation to the crimes with which they are charged."[3] This admits that in order to follow out a scheme of possible combinations a table has been printed which has no value whatever.

b. Defective tabulation is to be noted in the tables relating to occupations of prisoners prior to arrest. These occupations are summarized in groups, but the groups here given do not accord with the occupation tables of the census, and in the introductory analysis no attempt is made to correlate the figures here given with those of the census of population. This lack of harmony between different parts of one and the same census is one of the gravest faults of the eleventh census and is unfortunately of not infrequent occurrence.

c. An example of superfluous tabulation is found in Table 55,[4] which gives a combination of the birthplace

[1] *Idem*, 2 : 254–273.

[2] Table 93. *Idem*, 2 : 387,f.

[3] *Idem*, 1 : 189.

[4] *Idem*, 2, facing p. 276.

of fathers and mothers for persons of mixed parentage. The numbers are in many cases too small to be significant, even if we knew the corresponding data for the population at large. But even in the cases where the numbers are considerable it adds nothing to our knowledge to know that the combination, A father and B mother, occurs x times among prisoners, so long as we do not know the frequency of the combination among the general population.

d. The absence of data for the general population on degree of industrial education, advanced education, idleness or employment at a given time, health, and use of alcoholic liquors, renders their inclusion in the statistics of prisoners of doubtful utility. The paucity of the analysis on these points is proof that it was not practicable to draw from them conclusions of any particular significance.

It should not be overlooked that questions of such a nature may in some cases become generalized and be applied to the population at large. By ascertaining such facts concerning a population group we sometimes make a step towards enlarging our knowledge of the population generally. But it may be doubted whether the questions here mentioned are capable of general application.

We may now turn our attention briefly to the analysis of the statistics of prisoners contained in Part 1.[1] The text has been prepared with a great deal of care and many calculations of percentages have been made with the idea of bringing out the main results of the inquiry.

But the comparisons which are made do not always attain this result. They suffer from two defects.

[1] *Idem*, 1 : 123–263.

(1) Certain phenomena are grouped according to percentages of the total number of prisoners, without a reference to the corresponding classes in the population.

(2) When comparisons are made with the population, it sometimes happens that they are not made in the proper form.

(1) In comparing proportions of men and women in prison at different ages it appears that in the higher age classes the proportion of women to all in the respective classes is greater than in the lower age classes.[1] This fact seems to authorize the statement that in later life the tendency to crime is relatively stronger among women.[2] But such a statement assumes that the proportion of men and women in the general population is the same at each age class, an assumption which students of vital statistics are fully aware is untenable. Had the comparison been made with the number of persons living of each sex and each age class we should have been able to see the facts much more clearly.

As the value of statistics of personal and social characteristics of prisoners depends upon a comparison with the same elements in the population at large, it is hardly necessary to point out again that where such comparisons cannot be made, data relating to prisoners have little value.

(2) The comparisons made with the entire population ignore the fact that prisoners are recruited entirely from the adult population. This affects many comparisons, of which the following are illustrations:

[1] *Idem*, 1: 155.

[2] "In later life, generally speaking, the tendency to crime is relatively greater among women, but in early and middle life among men." *Ibid.*

First,—We are told that the ratio of prisoners to the total population is greatest in the western section of the United States.[1] This is in part due to the fact that that section contains in its population the largest proportion of adult males, but of this we have no hint in the report. In like manner we are informed that the same section contains the smallest percentage of female prisoners.[2] Without the explanation that adult females were relatively less numerous in the general population west of the Rocky Mountains than east of them, the fact seems to be explicable only on the ground of greater virtue.

Secondly,—We find a comparison of the prisoners of foreign birth with the foreign born population, and of those of native birth with the native born population.[3] The defect of such a comparison has been frequently pointed out. The foreign born population, chiefly adults, furnishes naturally a much larger proportion of criminals than the native born population, which contains a large proportion (nearly one-half) of children.[4] Whatever differences may exist between the different elements with respect to the quotas which they furnish to the prisons, it is of the utmost importance, in view of the role of this question in current discussion, that they should be correctly calculated.

[1] *Idem*, 1 : 126.

[2] *Idem*, 1 : 128.

[3] In the table on page 125 and in a subsequent remark on page 126. It is to be noted as an unexplained curiosity that the ratios printed on page 124 and the comment immediately following the table do not agree with those printed on page 125. In the subsequent pages it is substantially the latter ratios which reappear as on page 166.

[4] Cf. the author's Annual Statistics of Prisoners, 1890, and H. H. Hart, Immigration and Crime, in Am. Journal of Sociology, 2 : 369. (1896).

Thirdly,—In the treatment of marital relations[1] the age element is neglected. The fact that sixty-four per cent of the prison population, as compared with 59.29 per cent of the general population, are single, has no special social significance. But if it is remembered that the prisoners are adults, and that among the adults (twenty years of age and over) in the general population the proportion of single persons is 25.64 per cent, the facts relating to the conjugal condition of prisoners acquire a new significance.

III.

Our criticism has thus far related to the statistics of prisoners, and as such has pointed out some defects in the census of 1890. It is generally supposed that statistics of prisoners and statistics of crime are one and the same thing. But such is not the case. The census volume tells us very little about crime.

In the statistical study of crime we are interested in quantitative measurements. This is sometimes designated as the quantity of crime, and the questions of interest relate to the extent of crime among the population at large and in the several classes which compose it. Now the quantity of crime can be nothing else than the number of crimes committed (or ascertained to have been committed) in a given space of time (a year) by a given population. The ratio which expresses this quantity in analogy with the birth and death rate may be designated the crime rate. It is this crime rate which is of importance for the study of criminal tendencies.

The number of prisoners at a given time, which depends upon the number of persons committed to prison annually and the duration of their sentences, is no indica-

[1] Eleventh Census. Crime, Pauperism and Benevolence, 1 : 168.

tion of the quantity of crime, and cannot serve as a substitute for the crime rate. This can be made clear by an assumed case which exaggerates the disparities of actual experience but illustrates the principle. Suppose two towns, A and B, each of 100,000 population, and each with 200 prisoners on the census day. Judged by the number of prisoners, crime in the two towns appears to be equal. Let us suppose that in each town prisoners are received at regular intervals, and that each prisoner in town A is sentenced to two years' imprisonment, while in town B each prisoner receives a sentence of six months. In such a case there must be one hundred prisoners sentenced annually in A and four hundred in B to maintain an average prison population of 200 in each town.

Or again supposing that in a given place the same number of offenses are committed annually. Should sentences become more severe the number of prisoners would increase; should they become lighter it would decrease.

There is, therefore, no necessary connection between the number of prisoners and the quantity of crime committed. The proportion of prisoners to the population is not a substitute for the crime rate.

Such being the case the ratio of prisoners to population can only be an indication of the crime rate in the rare case in which the sentences for two groups compared follow the same rules. If sentences should be longer or shorter now than formerly, historical comparisons based upon prisoners would be inaccurate. In an article on "Crime and the Census,"[1] the writer has attempted to examine how far the prison population gives an indication of the crime rate. By an analysis of the

[1] Am. Academy of Political and Social Science. *Annals*, 9: 42–69 (1897).

various sentences imposed, which cannot be reproduced here, he reached the following conclusions:

"The census volume fails to give us a correct idea of crime in the United States.

1. Because it furnishes no basis for a calculation of the increase of crime.

2. Because in depicting the geographical distribution of crime, it favors one locality at the expense of another.

3. Because it exaggerates the number of the male sex in the aggregate of crime.

4. Because it assigns to the negroes a larger, and to the foreign-born white a smaller, share in the total of crime than belongs to each.

5. Because it distorts the picture of the relative frequency of the different classes of crime."[1]

As the foregoing quotation suggests, it is not only for crime in the aggregate, but also for the crime of special groups that we stand in need of the crime rate.

[1] In March, 1897, Mr. W. D. Morrison published in the *Journal of the Royal Statistical Society* an article upon "The Interpretation of Criminal Statistics," from which the following sentences bearing upon this point are gathered: "It is as well to state at the outset that all competent statisticians are agreed that the movement of crime in a community cannot be determined by a reference to the movement of the prison population, or in other words by an appeal to prison statistics. . . According to these returns (English prisons) the daily average prison population, both in local and convict prisons, has decreased almost continuously year by year during the last seventeen years. At first sight this continuous diminution of the prison population looks exceedingly like a corresponding decrease in the amount of crime. But a closer examination of the matter shows that a decreased prison population is not necessarily produced by a decrease of crime. The daily average prison population depends on the duration of sentences and not upon the amount of crime." . . . "It is of course to be admitted that if sentences were of the same length at the present day as they were about twenty years ago, then the prison population would be an approximate index of the movement of crime. But we know as a matter of certainty that sentences are not so long now as twenty years ago." Mr. Morrison then goes on to show that the heavier classes of penalties are less frequently imposed than formerly, and that in each class it is the less severe penalties which are growing in importance.

IV.

The census of 1900 must of necessity make an enumeration of the prison population as an integral part of the general population. But in so far as it seeks to elucidate special problems of crime, we believe that a mistake would be made in following the traditions of the past, and in utilizing the prison population for the purpose.

In so far as crime is a subject of study, there should be an effort to approximate the methods and practice of other countries. But an enumeration of cases judicially decided offers many difficulties because of the multiplicity of courts. The problem is somewhat simplified if we seek the statistics of admissions to penal institutions on conviction of crime.

This is a practicable basis for crime statistics in the United States. There remains only the question of organization. Obviously the figures relating to the year of inquiry should be collected continuously throughout the year. The schedules should be prepared early and should be in the hands of prison officials long enough in advance to reach a complete understanding. The work would be greatly facilitated by the preparation of a model prison register, which should be so arranged as to contain the data required by the census as well as that prescribed by state legislation.

Of course such a plan would break with past traditions, and would leave us for a time without any historical comparisons. But this evil is less than that of faulty comparisons. For long term sentences of one year and over it might be possible to establish from the records of the larger institutions, which as a rule are well kept, the number committed each year for the last ten years, and thus to establish a basis of comparison for a most im-

portant section of the criminal population. Indeed the interest in this subject would warrant annual statistics of this class, and the task would not encroach seriously upon the resources of the census bureau.[1]

The propositions of the writer are for statistics of crime upon the basis of persons convicted and received by penal institutions in the course of a year.

1. For serious offenders (sentences of one year or of greater severity) *Annual* Statistics.

2. For minor offenders (sentences of less than one year) *Decennial* Statistics.

NOTES ON FOREIGN STATISTICS OF CRIME.

The statistics of crime in foreign countries are based upon judicial proceedings. The subordination of the judicial authorities to the central government, the universality of the criminal code and the uniformity of its application, render it possible for the central government to collect statistics in this fashion.

Statistics of prisons are a secondary source of information, but they are largely of an administrative nature. They offer no suggestions which could be of interest in the United States.

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[1]For fuller discussion see article on "Crime and the Census," *Annals of American Academy of Political and Social Science.* Vol. IX. p. 66 *et seq.*

Pauperism and Benevolence.

A discussion of the statistics of pauperism and benevolence in the United States should cover, not only paupers and inmates of benevolent institutions, but to some extent also the insane, feeble minded, deaf and dumb and blind, many of whom because of their physical infirmities are wholly or in part dependent upon public support. Many persons classed in the census statistics as paupers would doubtless be more properly enumerated under feeble minded and other special classes indicated, if the separation of such classes in almshouses was more perfect and the statistics more accurate. The census, however, in its enumerations for recent decades has drawn a somewhat arbitrary line of demarkation between crime, pauperism and benevolence on the one hand, and the insane, feeble minded, deaf and dumb and blind on the other. In the eleventh census the enumeration of the two groups thus indicated was placed in the hands of two separate special agents. The published results show a two volume report on crime, pauperism and benevolence,[1] and a single volume devoted to the second group of dependent classes. It is the purpose of this report to discuss only the material in the volumes on crime, pauperism and benevolence, and only so much of that as relates to pauperism and benevolence; the subject of crime having been considered in the preceding paper by my colleague, Professor Roland P. Falkner.

[1] Which contains an enumeration of insane paupers, classifying them by sex, color, nativity, race, and by the institutions in which they were found.

I.

Let us review briefly the history of the treatment of pauperism and benevolence in the United States census. Inasmuch as the defective classes were enumerated much earlier than paupers strictly so-called, and were evidently considered as including the bulk of dependency as well, a word concerning this enumeration may not be out of place. The census of 1830 is the first one with any information on the subject. In it we find the figures given for both the white and the black populations, indicating the number of deaf and dumb with general classification for the three ages,—under fourteen, fourteen to twenty-five, and twenty-five and upwards; and figures covering the aggregate number of blind persons. In the census of 1840 the same information was furnished, and in addition, the numbers of insane and idiotic, both white and colored, were added, and also the number designated as at public charge and at private charge for both white and colored, for the insane and idiots, grouped together. The census of 1850 was the first which distinctly included crime and pauperism. Concerning pauperism, this census gave the whole number of paupers supported within the year ending June 1, 1850, further subdivided into native and foreign; and also the whole number of paupers on June 1, 1850, likewise subdivided; and finally, one column giving the actual cost of support.[1] The circular of instructions to the marshals who took the census says that it is presumed that the facts with reference to the whole number of paupers of American birth who have received support within the year and the whole number of paupers born out of the United

[1]Seventh Census. Compendium, 163.

States who have been supported in whole or in part within the various sub-divisions, may be inserted from public records.[1] It then adds a statement to the effect that the facts concerning the whole number of native born paupers supported on June 1, 1850, and the whole number of those of foreign birth supported on June 1st, "will be obtained with certainty by population schedule No. 1." It also adds: "The cost of support can be obtained, it is presumed, from your county, parish, or other records. You will avail yourself of the best sources of information within reach; and where the exact amount cannot be obtained, insert the nearest estimate at which you may be enabled to arrive."[2] It is altogether probable that estimates on the part of those who had little familiarity with pauper institutions were the order of the day and remained so in many subsequent censuses. The following note shows the method and extent of the statistics of pauperism in the seventh census:[3]

"The census returns the number of paupers supported in each county in the United States in whole or in part at public expense within the year preceding, and the actual number on the 1st June, 1850, native and foreign, with other particulars. As no account is taken in it of those supported or relieved by individual charities, the statistics, it has been thought, would not represent the whole of the facts, and if absolutely relied upon as a test of condition would be unjust towards those sections in which nearly the whole of the relief is public. Perceiving the weight of the objection the superintendent issued a circular in March, 1854, to the proper officers of several states in different sections, in order, if possible, to make

[1] Seventh Census, xxv.

[2] *Ibid.*

[3] Seventh Census. Compendium, 161.

some estimates of the *private* charities, benevolent associations, etc., but although many interesting returns were received, they were not as numerous as were desired. The following, however, from Massachusetts and Rhode Island, New Jersey, Georgia and South Carolina will show that private relief by societies and associations is administered to a large extent in states where the poor laws are most perfect, and reasoning for the whole from a part taken from sections indiscriminately, it may not be unfair to assume that the proportion relieved by other than public means does not differ much in the several states."

In the volume quoted an attempt has been made to give the number of paupers actually to be found in poor houses on the 1st of June, 1850.[1] A table is made up for the following states, Massachusetts, Maryland, Virginia, Mississippi, Missouri, Indiana and North Carolina, giving the total number of white inmates, male and female; the total number of free colored, sub-divided into black and mulatto, and each of these classes again sub-divided into male and female; the aggregate white and free colored, classified according to the three age periods,—under fourteen, from fourteen to twenty-four, twenty-four and over—and also clsssified according to nativity in the following manner,—born in the state, born out of the state and in the United States, born in Ireland, born in Germany, born in other foreign countries, birthplace unknown. To this table there was appended a note stating that it was compiled in the office from the population schedules and that time did not admit of an examination in other states than those enumerated. This is the first attempt at an actual enumeration for a few states only of the pauper inmates of almshouses on a given date. The other tables in this census include the paupers in or out

[1] *Idem*, 164.

of poor houses who were known to be receiving public support on the date indicated. The census of 1860 was apparently taken in the same way and covered the same ground as that of 1850. Five months were allowed for the taking of each of these censuses and all the work was done by United States marshals. It is only fair to add that no particular thought seems to have been given in any country at that time to the statistics of pauperism as a part of census work. In proof of this statement it may be noted that the recommendations of the International Statistical Congress, assembled at Brussels in 1853, made with a view to securing some uniformity in the material covered by the census in different countries, suggest among other things an enumeration of the blind, of the deaf and dumb, and of lunatics at home and in public and private asylums, but make no mention of the statistics of pauperism. These recommendations in reference to the defective classes were adopted in or before 1860 by Austria, Bavaria, Belgium, France, Holland, Prussia, Saxony, Sweden and the United States.[2]

With the ninth census in 1870, under the charge of General F. A. Walker, an attempt was made to enlarge the scope of the statistics of paupers and to make them more accurate. General Walker said that the eighth census in 1860 and previous censuses had calculated the returns of paupers in three ways and that in these returns there was no uniformity in presenting the results. He says: "In one state the aggregate cost of poor relief was practically divided by the known cost of sustaining one pauper one year and the quotient taken for the number of persons supported during the year,

[2] Edward Jarvis. In Appendix C. (p. 101,f.) of Garfield's Report on Ninth Census. House Documents, Reports of Committees, Second Session, Forty-first Congress. 1869–'70.

while in another state all persons entering a work or almshouse for ever so limited a period were included, and in a third every person receiving so much as a half ton of coal in a hard winter or a dozen soup tickets was set down as among the state's poor."[1] In General Walker's opinion, there are four desiderata in ascertaining the pauperism statistics from the census point of view.

First—The number of persons actually inmates of asylums and alms or work houses on one or more days of the year, should be given. Preferably three or four days should be taken for the count and if only one return can be obtained, the date chosen should be as strictly representative of the year as possible. This latter condition is not met in the census date, June first, which is as little representative of the average almshouse population as any date could be. General Walker in testing his theories, and in order to show the inadequateness of a return for any single date refers to certain statistics of the state of New York, in which the actual number of inmates of county poor houses and state work and almshouses on the first day of December, 1869, and again on the first day of December, 1870, was ascertained from the books of the several institutions. December first was chosen on the ground that it "would probably not show quite so large a number of paupers as a date nearer the close of the winter, but December would certainly exhibit a larger number than any other month of the spring, summer or autumn, excepting March, and possibly April, and is therefore to be regarded as presenting an exceptionally fair average for the year."[2] The statistics for New York obtained on this plan showed 15,053

[1] Ninth Census. Population and Social Statistics, 564.
[2] *Idem*, 563.

inmates on December 1, 1869, and 15,352 on December 1, 1870. But General Walker goes on to say: "The books of the same institutions record the admissions during the year, whose beginning and ending are thus defined, including those remaining at the beginning of the year, of no less than 59,136 persons." In addition to this number no account was taken of the temporary and partial outdoor relief in the state of New York throughout the year, the expense of which aggregated $911,855.15 and is said to have been extended to 101,796 persons. These, if added to the above total, 59,136, would give as the total number of persons receiving aid from funds appropriated distinctly for the poor, 160,932. Even in addition to this, General Walker reminds us that within the year, 1869, in the state of New York the Immigration Commissioners spent in relief work $330,000, and that out of either state or city treasuries there was appropriated within the state for hospitals, asylums, etc., $1,903,075.00 thus showing how inadequate a picture is given of pauperism by the enumeration of inmates of institutions on a single day of the year, even when that date is favorably chosen.

The second desideratum indicated by General Walker is that the amount of pauperism be calculated impersonally; that is, by dividing the aggregate expenditure for poor support by the ascertained cost of maintaining in each state and section by turns one pauper for one year. The third desideratum indicated is that the number of paupers who, for any period however limited, from the beginning to the close of the year, become inmates of any of the different classes of charitable institutions, should be given. The fourth desideratum is that the paupers receiving in any form and in any degree relief or assistance, in money or by supplies,

at the public expense, should be enumerated. The first two desiderata, namely, enumeration of inmates of poor houses and an estimate of the solid amount of pauperism, were the only ones attempted in the census of 1870. In respect to the relative value of these two items, General Walker himself felt that the number of inmates was always a very inexact measure, and that "the most exact single estimate possible for the actual pauperism of a country is undoubtedly obtained by dividing the aggregate cost of support by the ascertained cost of supporting one pauper for one year. This gives the *amount* of pauperism, reducing it to a solid form, and affording opportunity for easy and just comparison between states and sections."[1] In the census of 1870 estimates of this character were furnished, based on the cost for permanent and entire support, which varied from seventy-five dollars to ninety dollars in rural districts and from ninety to one hundred and twenty-five dollars in towns and cities. The amounts spent by Immigration Commissioners in cities and amounts appropriated by states to private charities were, of course, omitted in estimating the total expenditure within a given state or section.

The census of 1880 made a distinct departure in consciously adopting the term "dependent" and defining dependents as comprising "paupers and those who, although not members of the pauper class, would be liable presumably to become such, were it not that private benevolence steps in and takes the place of official relief."[2] Thus not only the inmates of almshouses but those who received outdoor relief, and also inmates of homes for the friendless and for orphan and

[1] *Idem*, 564.
[2] Tenth Census, 21 : viii,f.

neglected children, were covered by this census. One volume of over six hundred pages was devoted to the subject of the defective, dependent and delinquent classes. In this volume fifty-five pages are devoted to introductory matter, in which Dr. Wines, the special agent, tell us that "before the present census no enumeration has been made of the inmates of charitable institutions for dependents who are not paupers."[1] Dr. Wines also remarks that the attempt to secure a complete enumeration of the outdoor poor in the census of 1880 was a failure, and in comparing the total number of almshouse inmates for the year 1880 with the reports of some figures for previous censuses, he says: "We may suppose that it was not intended to include them [outdoor poor] heretofore;" also, "there is no evidence that outdoor paupers were enumerated in any previous census."[2] Some departure in method seems also to characterize the tenth census, inasmuch as the basis of the investigation was a list of the institutions throughout the United States prepared with great care in advance and intended to cover all the important charitable and correctional institutions of the country. A special schedule was then prepared for each separate class, and the enumerators required to transfer from the population schedule the name of every defective person to its appropriate special schedule, and upon that schedule to answer the definite questions applicable to him as a member of the class to which he was supposed to belong.

The bulk of the volume before us deals with the insane (440 pages). About one hundred pages are devoted to statistics of crime, and finally thirty-six

[1] *Idem*, 21 : ix.
[2] *Ibid.*

pages[1] to paupers and homeless children. It is with these thirty-six pages that we are at present concerned. To give another idea of the relative amount of attention given to the paupers, we note that in all one hundred and thirty-six tables of statistics were submitted and that eight of these relate to paupers. These eight cover the following subjects:

First—Paupers in almshouses in the United States in 1880, by states and territories, showing the number of almshouse paupers in the aggregate and by sex, nativity and race.

Second—The same information for outdoor paupers.

Third—Paupers in almshouses in the United States, 1850 to 1880, by states and territories, showing apparent increase in number of almshouse paupers during the past thirty years; and also the ratio of paupers to the total population at each census. According to the statement of the census authorities themselves, this comparison is utterly worthless,[2] and the figures in this table, with the exception perhaps of the calculation of the ratio of paupers to total population for the census year 1880, might better have been omitted.

Fourth—Almshouse paupers in the United States in 1880, by states and territories, showing total and average time by days spent in almshouses by the inmates. This is an interesting and valuable item, although obtained for only a part of the total number of almshouse inmates reported in the census.

Fifth—Age analysis, by years, of almshouse paupers in the aggregate and by sex, nativity and race.

[1] *Idem*, 443–475.

[2] "Any comparison between this census and any other with respect to the defective, dependent or delinquent classes is almost impossible." *Idem*, 21 : ix.

Sixth—The same information for outdoor paupers.

Seventh—Age analysis of almshouse paupers by ten year periods for each state, given in the aggregate and for sex, nativity and race.

Eighth—Almshouse paupers in the United States in 1880, showing their physical condition, form of disability, number having relatives in the same institution; by sex, nativity and race.

No attempt was made in this census to elaborate the returns of almshouse inmates and outdoor paupers. The figures are put down with the usual analysis with reference to the ordinary elements of the population, such as sex, nativity and race. That the actual enumeration of almshouse inmates, and more particularly of the outdoor poor, falls in all probability far short of the real number, is frankly admitted by the census authorities. Mr. Frank B. Sanborn in speaking of the census tables of 1880, says:[1] "These tables do not, in fact, give even an approximation to the truth concerning American pauperism." The number of paupers in almshouses reported in this census was 66,203, and the number of outdoor paupers 21,595, making a total of nearly 88,000. Mr. Sanborn, who has had large experience in dealing with institutions, says in the article already referred to: "If I were to estimate the number of paupers in our whole country, I should not set it at more than 300,000 persons at any one time, and perhaps 1,000,000 different persons during the year, who, in our population of some 55,000,000, are forced to eat the bread of others, as M. Baron says." This estimate of the number of different persons within the year who probably receive relief amounts to about one-half of one per cent of the total population, and tallies almost

[1] Article "Pauperism" in Lalor's Cyclopedia of Political Science.

exactly with a similar estimate made by the present writer in commenting on the census returns for 1890.

II.

Turning now to the eleventh census, we find from statements made by the Superintendent, Hon. Robert P. Porter, in his Introduction to the Compendium, that the methods employed differ slightly from those in 1880. The insane, feeble minded, deaf and blind are classified under the head of special classes and are treated in a volume by themselves by another special agent than the one who treats of the statistics of crime, pauperism and benevolence, Dr. John S. Billings having charge of the enumeration of the insane, etc., and Dr. Frederick H. Wines, who was also a special agent under the census of 1880, having charge of crime, pauperism and benevolence. Mr. Porter says that in "securing information relating to pauperism and crime for tabulation there was no essential difference between the tenth and eleventh censuses. Schedules were sent to the larger institutions, to be filled by the officers in charge, and for the smaller institutions reliance was placed upon the regular enumerators."[1] The inquiries were much the same as in 1880. There were few added, though the form of the schedule was somewhat improved. One new feature was the appointment of some three or four thousand institution enumerators, selected by the authorities in charge of the institutions, and specially paid to fill out the institution schedules. This plan was followed in connection with the benevolent institutions reported as well as for the almshouses. In the opinion of the census authorities it worked well, and secured superior ability for difficult enumeration.

[1] Eleventh Census. Compendium 1 : xxi.

The outdoor poor are omitted altogether in the final published results of this census. An enumeration was attempted and the results reported in a census bulletin,[1] but in the opinion of the Superintendent of the Census this report was misunderstood. He tells us that not one in ten of outdoor paupers has been or ever will be discovered by census enumerators. Hence, when the final volumes were published, the results of this attempted enumeration were omitted.

A special schedule for almshouse and benevolent institutions was prepared, comprising two pages of questions, the first page of which was the same as that of the schedules for all special classes and the second page of which varied for each given class. The questions are reprinted in detail in the census volume.[2] Two volumes were published giving the results, one containing the analysis of tables and the other the tables themselves. Three hundred and sixty-six tables are presented, sixty-six of which relate to pauperism in almshouses; three to insane paupers in hospitals and asylums for the insane; and sixty-nine to inmates of benevolent institutions; making in all a little less than half the total number of tables devoted to pauperism and benevolence as compared with a little more than half the number of tables devoted to crime. In reference to amount of space covered, just about one-half is given to the discussion of crime.

One of the most notable features of the volume devoted to analysis of tables is the introduction devoted to "inmates of all institutions."[3] In so far as it places side by side the different results for the various classes of institutions, it is valuable. It thus affords an opportunity for

[1] *Idem.* Bulletin 90, p. 13.

[2] Eleventh Census. Crime, Pauperism and Benevolence 1: 1, footnote a.

[3] *Idem* 1: 7–120.

comparing readily the different classes. It attempts, however, an analysis of the inmates of all institutions considered as a single group. This is of somewhat doubtful value, because the various groups differ so greatly that it is questionable whether they should be aggregated. If we take as an illustration the ratio of inmates of each age class to corresponding age classes in the general population[1] and compare it with the figures for the various classes of institutions,[2] it is clear that they follow such different lines that their combination seems arbitrary. The same criticism may be made of the statistics of marital condition and illiteracy. A critic is usually tolerant of the superfluous, provided he finds what he wants. The exhibition of results for different institutions side by side being the more valuable part of the analysis, one is disappointed when he finds that the practice of the report is not uniform. In some places the separate institutions are omitted. In this first summary a space is given to the comparatively worthless figures of the aggregate population of all institutions.

Turning now to the analysis of tables, relating to paupers in almshouses,[3] we find the usual elaboration of the total of 73,045 paupers in the United States on June 1, 1890, indicating the distribution according to color, nativity and race and the ratios to the population for the several census decades. The ratios are then given for the geographical divisions and separately for each state and territory, distinguishing the aggregate, the white, colored, native and foreign born. Another distribution of the same figures gives the results of a minute inquiry into the parental origin of the paupers of the United States in 1890, and the answers to ques-

[1] *Idem*, 52.
[2] *Idem*, 56.
[3] *Idem*, 267-314.

tions concerning naturalization and ability to speak English. A minute age analysis of the aggregate pauper population and a table presenting the ratio of paupers in almshouses of certain age periods to one million of the population of the same age periods, by sex and by states and territories, follow. In the next place the rather important question of health is analyzed for the aggregate pauper population and by geographical divisions, and for each sex. The reports of those in good health are of little value, inasmuch as they include the uncertain element of cases not reported. The columns, however, showing the number of insane, blind, deaf mutes, idiots and crippled persons who are maintained in almshouses, are of considerable interest to those who treat of questions of almshouse administration. Tables giving the occupations of almshouse inmates prior to their admission and indicating the assigned cause of pauperism are given. The table of causes is a complete failure, inasmuch as a varying number of causes has been assigned to each case, and no attempt at discrimination or uniformity in the assignment of causes has been made apparently in the enumeration. No attempt is made to assign a predominating cause in each case so as to represent each case by a single cause. The aggregate of assigned causes exceeds considerably the number of cases. The causes as stated, however, are analyzed at considerable length with reference to sex. As an illustration of the value of the census assignment of causes, it should be noted that one of the causes assigned to 72,722 out of 73,045 inmates of almshouses is "no other home."[1] Finally, the enumeration of children under sixteen years of age in almshouses is of considerable interest in view of the

[1] *Idem*, 303.

legislation in most states, requiring such children to be placed in separate institutions.

A general summary of the information on pauperism contained in the eleventh census is found most conveniently in the Compendium, where, in four pages,[1] are summarized the results of six tables as follows:

1st.—Pauperism classified by sex, color, nativity and race.

2nd.—Almshouse paupers by geographical divisions.

3rd.—Nativity and parentage of paupers.

4th.—Birthplace of foreign fathers or foreign mothers.

5th—Birthplace of foreign parents.

6th.—Analysis of mixed parentage.

In two additional pages we find the inmates of benevolent institutions enumerated by sex, color, nativity and race; and also with reference to these elements by geographical divisions. Six tables showing by states and territories the aggregate number of paupers and inmates of benevolent institutions separately, distributed according to color, nativity, race and sex, will be found in the same volume.[2]

III.

Having thus briefly reviewed the history of the census, as far as it has dealt with the subject of pauperism, and having set forth somewhat in detail the results presented in the eleventh census on this subject, a few general comments may be made upon the worth of this material to students of the subject. What may be said by way of adverse criticism is not intended in any captious spirit, nor to be considered in any way as a personal reflection upon the efforts or ability of the special agent in charge of this work. There are cer-

[1] Compendium, 2:170–173.

[2] *Idem*, 2:202–207.

tain well-known general causes for the lack of valuable results in the United States census, which are due largely to the fact that we have no permanent census bureau and that the time usually allotted by Congress for the taking of the census is wholly inadequate for so huge an undertaking as that attempted in 1880 and 1890. And finally, the census law itself is usually drawn up in such a way as seriously to hamper all such social inquiries as that into the state of pauperism in the country.

The first point to be considered is the value of the original calculation as to the number of almshouse paupers in the United States. The fact that no students familiar with the conditions of pauperism would think for one moment of accepting this figure as in any wise indicative of the total amount of pauperism of the United States renders the subsequent elaboration of these figures of doubtful value. Even if this figure is absolutely correct, so far as the inmates of almshouses are concerned, it does not approximate the real figure for the public paupers in the United States; inasmuch as in various sections of the country the almshouse is not the method of providing for the public poor. Thus, in general, the low figure for the southern states, as compared with the northern states, is due largely to the fact that in the south the public poor are boarded out in families or assisted in their own homes. To know the exact number of persons in almshouses would be valuable, therefore, only if we knew at the same time the exact number of people publicly supported in other ways. Then we would be able to make interesting comparisons as to the relative extent to which different methods were adopted in different sections of the country. Even where the almshouse is the recognized mode of treatment for the public poor, the amount of outdoor relief paid for out of public funds

is very considerable. Yet the census authorities say that under existing methods it is impossible to get statistics of outdoor relief. Hence, they condemn to a large extent the validity of their own figures concerning institutional relief, so far as their practical value for students of social questions goes. If the mere enumeration of the number of inmates of almshouses is all that can be obtained through the machinery of the census, it would certainly seem wise to give these figures without the elaborate statistical analyses and groupings to which they were subjected in the eleventh census. On the other hand, no one interested in statistics can fail to appreciate the excellent use of statistical methods made by Dr. Wines in his elaboration of figures of little value to begin with, and in his illustrations and diagrams of the most approved modern pattern.

The statistics of beneficiaries of the benevolent institutions of the United States cover four groups of institutions as follows:

1st.—Those primarily intended for the care of children, though some adults are found in them; notably those who have grown from childhood to maturity without finding any other home.

2nd.—Institutions primarily for adults, though containing children, especially where babes and younger children have been admitted with their mothers.

3rd.—Hospitals and infirmaries.

4th.—Miscellaneous institutions not included in other groups.

The chief criticism to be applied to these figures seems to be the fact that the list of institutions covered is probably hopelessly incomplete. And furthermore, that in several of the classes, institutions are included which are benevolent in name, but in no sense to be

regarded entirely as charitable. This is the case with homes provided by various Friendly Societies and Orders, where the inmates have paid perhaps for admission and are entitled to care during old age, in virtue of having paid dues on a partial insurance plan. There is no means of distinguishing how many of such institutions are included in this enumeration; hence the value of the total figures, even for the different groups of institutions, is considerably lessened. With reference to the analysis and elaboration of these figures, the same objections, therefore, apply as have been noted in the case of paupers.

IV.

In view of the numerous difficulties to which attention has already been called in the preceding paragraphs, it is with considerable hesitation that one attempts even to suggest a possible policy which it might be advisable for the twelfth census to follow. Inasmuch, however, as the schedules in connection with the last census, both for almshouses and benevolent institutions, were filled out by the representatives of the said institutions or by enumerators in each institution appointed by these representatives, it would seem possible to furnish without much additional cost a statement, giving the number of inmates on a given date in each month of the census year, that is, in each month of the year preceding the date of taking the census. These returns, of course, are usually copied from the reports or the books and records of the institutions, and in probably all of them it would be possible to find ready at hand or to calculate a monthly summary and, also to calculate an average for the year on the basis of these monthly figures. This would overcome some of the

objections which have been raised. The figures thus furnished would correspond to the figures furnished by the Registrar General in England for English pauperism and would present a better view of almshouse and institutional population than that given at present by our census. In the second place, if less expense were put upon the statistical elaboration of the figures thus obtained and more expense upon an attempt to secure the statistics of outdoor relief, the latter might be obtained with some measure of completeness by a minute examination through special enumerators of the administrative records of small local geographical divisions. Thirdly, it is certainly desirable that under existing circumstances less attention be paid to the statistics of benevolent institutions, or that they be grouped into a far larger number of classes, clearly and accurately defined as to character, methods and administration of the institutions included in each class.

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AGRICULTURE AND FARMS.

Agriculture.

After all the gigantic strides this country has made along the path of industrial development since the Civil War, it still remains largely an agricultural country. Agriculture still employs a greater portion of our population than any other industry, its products continue to furnish the larger part of our exports, its successes or failures still largely determine the degree of prosperity of the community at large. It is for this reason that the subject of the Economics of American Agriculture offers the most interesting field of study for the American economist and that it ought to be the subject of the most careful inquiry at the hands of the census investigator, taking precedence of all other subjects. Unfortunately such has not been the case with the census investigations which have been carried out so far. While it is true that some progress has been made from decade to decade, the degree of perfection attained remains as yet far from the goal one might wish to see reached. Perhaps for that state of affairs the economists are more to be blamed than the statisticians who work in the government bureaus: it is the province of science to point out the lines of research and for the official statisticians to carry out the suggestions, rather than for them to take the lead.

It is not the ambition of the writer to work out in this paper any comprehensive scheme for the agricultural statistics of the twelfth census; the object is to point out some of the questions which must needs interest every economist who would undertake a study of American agriculture; for there is probably no branch of science

which could make as much use of the agricultural statistics as that of economics. What then are the questions which the census statistics could and ought to answer for the economist?

The agricultural industry has undergone of late and is still undergoing a change similar to that which revolutionized the manufacturing industry, *i. e.*, the introduction of machinery.[1] It is natural to expect that the effects of such change should be far-reaching and of a very serious nature. True they can not be as radical as in the manufacturing or mining industry, owing to the peculiar conditions prevailing in agriculture, yet they have made themselves sufficiently felt to precipitate in England the troublesome question of "agricultural depression" and to give us a silver craze in this country which even to-day has not quite subsided.

The statistical data furnished by the census should be of such a nature, therefore, as to enable us to see whether, and if so where, the small farm is able to resist the competition of the large one, as well as the conditions which make its position different from that of the small workshop in the manufacturing industry. While our agricultural statistics answer one set of questions in this connection, they are altogether silent on another. From a perusal of the census volume we may learn to what extent the total agricultural product of this country has increased, how the products of the various crops have been growing or fluctuating from decade to decade; we can trace the same for the separate states and sometimes for counties; we can tell the amount of cotton in pounds and bales each state has produced, and trace it back for a few decades,—

[1] Tenth Census 3:513, 520,f. and 530 (volume pages.) Report on Cereal Productions, 133, 140,f., 150.

facts, no doubt, of great interest and value,—but, if we were to ask, how have the introduction of farm machinery, the improvements in grain transportation, etc., affected the economy of the farm, the official statistics would give us but little satisfaction. To enable us to find an answer, the data relating to cost of implements and machinery, fertilizers, live-stock, etc., should be arranged in such a way as to reflect conditions in each economic group, according to the classification adopted by the census. To explain: both the tenth and eleventh censuses contain a "classification of farms by acreage and tenure by counties," marked "Table 5," which gives three classes of farms according to the mode of tenure, viz., farms owned, those rented for fixed money value, and those rented for share of products. Each of these classes is subdivided into seven groups, according to size of farms. I shall have a word to say later on about the latter classification; for the present let us see what we can and what we can not learn from it.

As far as the classification goes it is excellent. By constructing proper tables from the data given there, we may be able to tell what type of farm is forging its way ahead in the various parts of the country; whether it is the 20–50 acre farm as is the case in the cotton-growing states, or the 100–500 acre, as the tendency seems to be in the north and especially in the northwest. One can, to some extent, answer the question whether the "bonanza" farm is holding its own or crumbling up into smaller holdings, and whether the latter are as small as those resulting from the ruin of the old slave plantations in the south; one can tell whether the tendency is toward an increase or decrease of farms cultivated by owners as against those rented, and finally whether the increase in rented farms represents a transition stage

from the position of the farm laborer to that of the farm owner, or *vice versa.* That is as far as we can go, although with the student of economics the above is only the beginning of his journey. The next question one naturally asks oneself is, what are the economic causes at work which are responsible for the one or the other tendency. There is no answer to that in the census, and yet the data actually collected by the census enumerators are amply sufficient to give one.

Table 6 of the volume on Agriculture, following immediately the table containing the classification of farms, gives the "number, acreage, and valuation of farms and products, with cost of fertilizers *by counties.*" The last two words explain the utter uselessness of the table. There can hardly be any interest,—outside perhaps of mere local interest, which could, however, be much better satisfied through other sources,—in the fact that Nance county in the state of Nebraska had in 1890, 1,092 farms covering an area of 215,058 acres, the cost of land, fences, and buildings being $4,108,738, that of implements and machinery $151,478, that of live-stock $1,004,209, and the estimated value of farm products $669,770. But were all these data arranged according to the size of farms as given in Table 5, they would be of immense value. We could then see that, while the 500–1000 acre farm invests a certain fraction of its total capital in machinery, the 100–500 spends it, say, on live-stock, and the 20–50 on something else. We could also tell what the expenditure is per unit of product in the case of each of the seven groups of farms, and consequently which is likely to be the winner in the competitive race on the world's market. This is practically the only way to determine whether an

increase or falling off in the number of farms in any particular group is merely accidental, due probably to some local influences, or whether it is due to important economic causes and thus indicates an actual tendency for the future. It is worth pointing out that the tabulation suggested would not involve any additional work in gathering the data; it would only require greater labor in their compilation and increase somewhat the bulk of the volume, unless other less important matters were left out. The lack of classification, as just pointed out, constitutes the most serious defect of the preceding censuses. Let us see now how the classification suggested above could be carried out in other respects.

1. *Cereals.* Under this heading we are given, in the eleventh census, figures relating to total area of land under cereals in general and the several crops in particular for several decades; the same is then carried out for the separate states to show the varying proportion each state has contributed to the total product of the country at various periods. Then follows a similar series of data with regard to total production (in bushels), and finally we have the distribution of the various crops by altitudes, a point of greater interest to the agriculturist than to the economist.

What would be gained if we had the data arranged according to size of farms? We could first see what particular type of farm tends more to specialization on one or very few crops, and which are the ones that advantageously adopt a more diversified system of cultivation. Secondly, after the system had been carried out for more than one census, we could tell what was the tendency in that respect with the various types of farms, large, medium and small. Knowing from the data mentioned before what the total product of the

farm was as well as its expenses (a point we shall consider later) we could tell what method of farming was the most profitable one for the particular type. We would further know what group of farms, (according to size) furnished the greater part of a given crop both absolutely and relatively, what type of farm was better adapted for intensive or extensive cultivation, which of the two methods paid better, what states were more favorable to one or the other method and why.

2. What has been said with regard to the classification of cereals applies with equal force to figures relating to fruit growing, market gardening, cotton raising, etc., as well as to unimproved land. The latter point is especially interesting, as it would give us a means of determining whether the area of unimproved land in a farm had any connection with its size.

3. *Live-stock.* The number of horses and other working-animals on the farm as well as their value should be given for the various groups of farms. This would show whether the amount of capital invested in working-animals was less per acre and per unit of product in the large farm than in the small one.

4. *Implements and machinery.* This should be carried out according to size of farms, as with the other items. Four more columns should be added under this head: (a) average length of service of the machinery; (b) its cost per year; (c) rent paid for itinerant machines;[1] (d) total cost of machinery per year. The cost of live-stock and machinery will show

[1] Owners of farms of moderate size who can not afford to buy a costly steam-thrasher or other expensive machine, but have a sufficiently large product to give at least a day's work to such a machine, hire it from owners, who rent it to the neighbors for a certain sum. These machines are called itinerant machines. (Cf. Tenth Census, 3 : 529, folio page.)

what type of farm has the economic advantage after we take into account the amount of money spent yearly in wages. That brings us to the question of the

5. *Working force employed on a farm.* Five columns may be arranged under this head:

(a) Members of the family engaged in work on the farm.

(b) Number of hired laborers employed.

(c) Total work-days during the year put in by hired labor.

(d) Amount expended in wages.

(e) Average length of employment of a laborer per year.

A word or two in explanation of this table. In the special investigation undertaken by Professor Brewer in connection with the tenth census, one of the questions in the schedule worked out by him read as follows: "What proportion of the hired labor of the grain farms is hired by the month or year? What proportion is hired by the day?"[1] The question, with the word "grain" left out, is practically repeated in the table just suggested. The question of labor and of the expense involved in hiring it is a highly important one. It is claimed that the "bonanza" farm is in a better position than the moderate or small farm to conduct its business on the principles of manufacturing industry. It hires its gangs of laborers for the busy season and discharges them as soon as they are not wanted, leaving but a very small number of men to attend to the live-stock, repairs, etc., during the winter. The small farmer is said to be unable to employ his help in strict conformity with such a system. The table is intended to bring out to what extent that is true of the farms of different sizes.

[1] *Idem*, 3:430, question 8.

6. *Fertilizers.* The same general remarks as to the necessity of giving cost for each group of farms hold true here. The usefulness of a classification like the one proposed appears under this head more than elsewhere, as it will give a direct indication where a more intensive cultivation prevails.

An additional table could now be constructed giving absolute and relative yearly cost of machinery, fertilizers, live-stock, and labor, for each of the several groups of farms.

As to the census classification of farms, it is on the whole excellent. The gradation adopted—farms under ten acres, ten to twenty, twenty to fifty, fifty to one hundred, one hundred to five hundred, five hundred to one thousand, one thousand acres and over,—is with one exception very practical, as it takes account of distinct types of farms, neither multiplying unnecessarily the number of groups, nor ignoring important subdivisions. The one exception is the 100–500 acre group. It is well known that a normal type of farm, one which keeps an average family in comfort, furnishing sufficient work to its working members, with perhaps an additional hand or two to be hired, is equal to about 160 acres. There can be no denying the fact that the difference between a five hundred acre farm and one containing one hundred and fifty acres is too large to allow of their being classed together. The economic and even social status of the owner of the former is quite different from that of the latter. In making a study of the agricultural statistics of the tenth and eleventh censuses, the writer found that the group of farms under discussion constituted more than half of all the farms in the North Central and Western divisions in 1890, and that it had increased considerably since 1880. As the 160 acre farm

may be justly considered a sort of landmark between the smaller type, which is barely sufficient to give enough employment to its owner, and the larger, which represents a purely capitalistic undertaking requiring a considerable outlay of capital and employment of labor, it, more than any other group, ought to be singled out instead of being merged into a higher one.

In view of all this, it seems desirable that the group 100–500 be subdivided in the twelfth census into two; one, let us say, of 100–200 acres, and the other of 200–500. The only objection which could be urged against such an innovation is that it would make the data incomparable with those of preceding censuses. But even that could be obviated by constructing an additional column giving the total for the two subdivisions. It may not be out of place to mention here that the same subdivisions have been adopted in the agricultural statistics of Great Britain.[1]

Another serious defect in the eleventh census, due to the fault of the enumerators rather than the statisticians in the Census Office, is the loose way in which farms and their subdivisions have been recorded in the census schedules. In commenting upon the decrease of the number of farms exceeding 500 acres each in the South Central division, Mr. Hyde, the author of the report on Statistics of Agriculture, remarks: "This may be due to reporting certain large plantations in one case as single farms and reporting their various subdivisions in the other case as separate holdings."[2] It is plain that, unless a remedy be found for that in the twelfth census, the figures will be worse than useless, they will be misleading. And yet there can hardly be a more interest-

[1] See for instance Agricultural Statistics of Ireland for the year 1891.
[2] Eleventh Census. Agriculture, 2.

ing as well as important question for the economist than that whether or not the old slave plantations have been crumbling up under the new conditions of southern agriculture.

It seems that the difficulty might easily be obviated if the enumerators were instructed to enter upon their schedules, in case of farms rented, only the land held by the lessee and not that leased by the lessor. Let us suppose, for illustration, that a farm of six hundred acres is visited. If four hundred acres are cultivated by the owner himself, they are to be entered on the schedule. The two hundred acres will find their way into the census when the lessee is called upon by the enumerator. There could be no repetition under such a system and from the data of two or three censuses we could tell whether the large plantations continued to be cultivated by their owners or were sublet or sold in smaller subdivisions.

There remains now a word or two to be said upon the method of classification according to mode of tenure. If the suggestions made in this paper were carried out in the main, it would be better to arrange all the data under the seven (or eight as has been suggested) heads corresponding to size of farms, leaving out the tables arranged according to mode of tenure. Instead of the latter, three columns might be arranged under each of the seven or eight tables, with the headings, "owned," "rented for share of product," and "rented for fixed money value." One of the advantages to be gained by such a re-arrangement of material would be the doing away with a source of error which among other things revealed itself in the considerable disparity in the numbers of farms recorded in the volumes on Agriculture and on Farms and Homes respectively. The discrep-

ancy between the results in the respective volumes can not be entirely explained away, as the writer in the census volume attempts to do, by the fact that the number of owners and the number of farms are not identical. It is due more to the method of classification now referred to. Let us assume a case of a farmer cultivating a piece of land of one hundred and fifty acres. If one hundred acres are owned by him, and fifty are rented, he would appear twice in the tables of the census: first, under the head of farms "cultivated by owners" and secondly, under that of "rented." Instead of getting the right conception of a farmer owning a hundred acres and sufficiently prosperous to be able profitably to rent some additional land, which is probably his first step toward a permanent "expansion of his territory," we gain the false impression of two farms one of one hundred acres owned and the other of fifty acres rented. A classification which allows correctly gathered data to be grouped in a way to create such an erroneous impression stands self-condemned. Under the method of classification suggested the figures would more exactly reflect the true state of affairs. The detailed representation of individual farms (if given in the census) would be something like this:

Size of Farm in Acres.	Owned. Acres.	Rented for fixed money value. Acres.	Rented for share of product. Acres.
150	100	50	
300	150	50	100
250	250	—	—

etc.

In the general tables for a given geographical division some such form as the following might be adopted:

NUMBER OF FARMS.[1]

Size of Farms in Acres.	Owned.	Partly owned, partly rented.	Rented for fixed money value.	Rented for share of product.
100–200	500	4,000	569	214
200–500	647	493	312	245

etc.

The writer is fully conscious of the shortcomings of the last table. The second column giving farms "partly owned, partly rented" would leave us in the dark as to what particular part of the farms is owned and what rented; also as to whether it is rented for money or a share of product. But it will at least do away with the heretofore unavoidable multiplication of the number of farms and the other errors incident thereto. Moreover, if desired, some attempt at bringing out the other facts could be made by means of a table constructed on some plan like that of table 4 (see below, p. 218).

It is greatly to be regretted that the methods which have to be pursued in getting statistics of farm-indebtedness are of such a nature as to make impossible the gathering of data relating thereto by the census enumerator. Were it not for that, our knowledge of agricultural economics would no doubt profit greatly by having these data arranged side by side with the other data given in the volume on Agriculture. The advantage which would be gained from the student's point of view is too obvious to need being pointed out. But I may perhaps be allowed to express a wish that when the data upon mortgage indebtedness are published in the future they be arranged not only by decades and by localities, as has been done in the eleventh census, but also according to size of farms. The latter, like nearly all the other suggestions made here, does not call for any additional work

[1]The principle is more completely worked out in Table 1 (see below, p. 216).

in the field, but merely for a more comprehensive tabulation of data which at present come into the possession of the Census Office.

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APPENDIX.

For the purpose of giving a graphical summary of what has been proposed here, the following tables have been prepared more with the view to indicate the direction in which changes are desirable, than with the idea of making them supplant the old tables in the census volume; that they are far from any degree of perfection none is more conscious than the author himself.

A number of useful tables could be prepared in addition to these submitted here, giving the production of various agricultural crops from cereals to cotton and flax by each of the eight groups of farms, just as they are carried out in the eleventh census by states and counties.

TABLE I.—CLASSIFICATION OF FARMS BY ACREAGE AND TENURE.

1. Farms under 10 acres:
   a. Owned.
   b. Partly owned and partly rented.
   c. Rented for fixed money value.
   d. Rented for share of products.
   Total.
2. Farms of between 10 and 20 acres (similarly classified).
3. " " 20 and 50 " " "
4. " " 50 and 100 " " "
5. " " 100 and 200 " " "
6. " " 200 and 500 " " "
7. " " 500 and 1000 " " "
8. " 1000 acres and over.
9. Total number of farms.

TABLE 2.—NUMBER, ACREAGE AND VALUATION OF FARMS AND PRODUCTS, WITH COST OF FERTILIZERS.

1. Farms under 10 acres :

a. Acres under crops.
- Acres under wheat. Per cent of total acreage.
- " " corn. " " "
- " " oats. " " "
- " " barley. " " "
- " " cotton. " " "
- " " green crops. " " "
- " " orchard. " " "
- " " other crops. " " "
- Total acres under crops. " " "
- Per cent unimproved of total acreage.

b. Valuation.
- Land.
- Fences and buildings.
- Live stock. (a. Working animals. b. Animals kept for other purposes. c. Yearly cost of working animals).
- Implements and machinery. (a. Cost of machinery on hand. b. Average cost of machinery per year. c. Rent paid for itinerant machines. d. Total cost of machines per year.
- Cost of fertilizers.
- Value of products.

c. Working force.
- a. Number of members of family engaged in work on the farm.
- b. Number of hired laborers employed.
- c. Total number of working days by hired labor during the year.
- d. Amount paid in wages during the year.
- e. Average length of employment (in days) per year.

The same classification for farms of each group of sizes, as shown in Table 1.

TABLE 3.—DISTRIBUTION OF YEARLY EXPENDITURE ACCORDING TO SIZE OF FARMS.[1]

(Total expenditure of class = 100 per cent).

Farms under 10 acres :
Per cent of total expenditure for wages.
" " " for fertilizers.
" " " for machinery.
" " " for live stock.
And so for the farms of various sizes.

[1] Buildings have not been included in this table, as their yearly cost is the resultant of so many uncertain elements that it would be difficult to get any accurate returns on that point.

TABLE 4.—FARMS PARTLY OWNED AND PARTLY RENTED.

a. For fixed money value, or
b. For share of product.

1. Farms of less than 10 acres :
Less than 10 per cent of farm owned.
10–25 " "
25–50 " "
50–75 " "
75–100 " "
And so for the farms of various sizes.

Farm and Home Proprietorship and Real Estate Mortgage Indebtedness.

I. INTRODUCTION.

A criticism of the work of the eleventh census is especially difficult, because the various parts of the work are of such different quality, and because only those who have had some experience can appreciate the difficulties which lie in the way of a successful transaction of a statistical investigation on so large a scale and of such complexity. No other part of the eleventh census, or of any census, was surrounded with so many difficulties as the inquiry which is reported in the two volumes on Farm and Home Proprietorship and Real Estate Mortgages. Such an inquiry was entirely novel, at least on so great a scale. Statistics of mortgage indebtedness had, indeed, been gathered by some foreign countries and by the labor bureaus of several states in this country. The most notable of these was, perhaps, that of Mr. J. S. Lord, who, as secretary of the Illinois labor bureau, had made in 1888 an admirable report on mortgages in Illinois.[1] This report really furnished the model for the method of handling the statistics obtained in the census inquiry. But no attempt had ever been made before in connection with any national census enumeration to cover a subject so vast and so intricate in its details.

The novelty and lack of precedents were not, however, the only difficulties, especially in the way of getting information concerning real estate mortgage indebtedness. The inquiry was set on foot at the last moment of preparation for taking the census. It concerned mat-

[1] Illinois Labor Statistics Bureau. *Fifth Biennial Report.*

ters on which people generally, and Americans particularly, are very averse to giving information. It was denounced as inquisitorial, as prying into private affairs and extending government authority to the detriment of the individual. So intense was the feeling that some people advised resistance to the Census Office in its attempt to get this information.

Again, the data were of such a character, and the territory to be covered was so large, that it was quite hopeless to expect accurate returns if they were collected in the usual way. The individuals interested could not be trusted to give correctly the facts concerning the existing indebtedness even if they gave them to the best of their knowledge. Incumbrance assumes many guises and exists under many names. To secure a terminology which would be universally applicable and understood was out of the question, and a wide acquaintance with the customs of different sections of the country was necessary in order to frame a proper schedule of questions.

All these difficulties made the task proposed as difficult as its masterly success was brilliant and complete. If it be true, as just now remarked, that no statistical inquiry ever undertaken by any government was more difficult than the collection and proper presentation of the facts of mortgage indebtedness, certainly none has ever been carried to conclusion "with more skillful care and conscientious fidelity." Its success far exceeded the expectation of statisticians who had studied such matters for years. The value of the information obtained well repaid the expense of getting it, and has probably reconciled the people to a renewal of the effort. A brief review of the means taken to get the data wanted will bring out clearly both the difficulties and the way in which they were met.

As has been already said it was at the last moment of preparation that Congress directed the Census Office to undertake these investigations. For several reasons it was decided not to entrust the work entirely to the regular enumerators, but to rely upon several sources of information. This was a wise decision. Only the less objectionable questions concerning ownership and debt were put upon the population schedule.[1] These were as follows:

"Is the home you live in hired, or is it owned by the head or by a member of the family?

If owned by the head or a member of the family, is the home free from mortgage incumbrance?

If the head of the family is a farmer, is the farm which he cultivates hired, or is it owned by him or by a member of his family?

If owned by the head or a member of the family, is the farm free from mortgage incumbrance?

If the home or farm is owned by the head or a member of the family, and mortgaged, give the post office address of the owner."

The cases in which the enumerators failed to get answers were investigated through the mail and by means of special agents. The results were gratifyingly complete. Of the total farm families only 1.24 per cent were not heard from on the question of ownership, and of the home families only 2.25 per cent; while the determination of the fact of incumbrance was unsuccessful for 1.26 per cent of the farm owning families and for 2.10 per cent of the home owning families. As to the amount of incumbrance, 18.35 per cent of the farm owning families and 25.98 per cent of the home

[1] Eleventh Census. Population. 1: ccv, Inquiries 26–30.

owning families were not heard from.[1] In other words, the returns are practically complete for ownership and for the fact of incumbrance.

In deciding upon the plan of investigation into mortgage indebtedness similar skill and wisdom were shown. Consideration of the plan adopted will be entered on later. Meantime it should be noted that the work was very thoroughly done. As the superintendent of the census put it, "the agents of the Census Office have . . . overhauled the records in every state and territory. They have travelled on horseback and on foot through the most sparsely settled districts of our vast domain in search of mortgages, and have done their work so industriously and so thoroughly that we now have on file in Washington as a result of their labor the abstracts of about nine million mortgages."[2]

In short, the volumes under consideration are easily among the best portions of the census. They show painstaking conscientiousness in the manipulation of the data, a thorough knowledge of the proper methods of approaching the subject, an appreciative sense of the difficulties and defects, and a skilled knowledge of the necessary methods. An examination of the first few pages of either volume furnishes strong proof that the editors have in a high degree what may be called a sense of statistical propriety. For there we find, what is too rare in census reports, a full account of the history of the projects to collect the statistics, a recital of the instructions to enumerators, a detailed statement of the methods employed in the tabulation, and a number of other details explanatory of the technicalities employed in marshalling the returns for analysis. The

[1] Eleventh Census. Farms and Homes. 7.
[2] Am. Stat. Ass'n. *Publications* 2 : 356 (1891).

presentation of these matters is very helpful to the reader in forming a critical judgment of the volumes.

The work is, then, of a high grade of excellence, and there is but little room for important criticism. In addition to the advantage derived from the peculiar suitableness of the editors for their work the inquiry had the benefit derived from a high grade of special agents. They seem to have been, in the main, men picked especially for the collection of the statistics of mortgages. These reflections lead to one or two *comments of a general character*:

II. CHARACTERISTICS OF THE TWO VOLUMES CONSIDERED TOGETHER.

1. The investigation into the subjects under review was so highly successful that it should, by all means, be repeated. After the experience recorded in these two volumes there can be no doubt, as indeed the editors themselves point out, that the facts sought can be ascertained accurately and with a high degree of completeness. Commissioner Carroll D. Wright said as long ago as 1887: "Questions of renting, of ownership, of the acreage of farms and of alien ownership are entirely within the possibilities of census taking, without enlarging the field of operation." We may now add that the feasibility of collecting mortgage statistics on a large scale is also demonstrated.

2. The same editors should be in charge of the next investigation, and, as far as possible, the same special agents. This is a matter in which experience counts for a great deal. If the inquiry is committed to the same management as before, the country may reasonably hope for an improvement in the work. If it is entrusted to new editors, however able they may be to cor-

rect any mistakes of their predecessors, they will surely waste time and impair the work by having to learn lessons which the previous editors already know. Moreover, it is absolutely essential that this and kindred portions of the census be kept absolutely free from the suspicion that they are being used for any but scientific purposes and the promotion of the public good.

3. Fault might be found with the bulk of the volumes. It is a question whether all the important information of the two could not have been presented in one volume by judicious grouping of related data. This criticism is not of much weight except in so far as it is based on a plea either that such conbinations of figures could be made, or that part of the matter included in the reports is unnecessary or fails to teach anything of importance. That the latter is to a certain extent true may be illustrated by reference, for example, to the volume on proprietorship.[1] The reader has just been occupied with a discussion of the relation of building and loan associations to home ownership and is transferred—without break—to "sales of real estate in Massachusetts" in order to learn the frequency with which the land changes hands. The statistics quoted from Massachusetts are so meagre and throw so little light on the subject that they are of very little value for the purpose and might as well be omitted. This is all the more true because the census itself has no figures with which to supplement those from Massachusetts.

4. A more important, and perhaps better founded, criticism may, however, be directed to another point. The various groupings of the returns follow one another without sufficient pains being taken to correlate them

[1] Eleventh Census. Farm and Home Proprietorship, 52,f.

when they are related, or to mark clearly the transition from one to another when they are not closely related. The transition is too abrupt. Both volumes would be greatly improved if they each had, first, a short summary of the conclusions to be drawn from each grouping of the figures,—that is, from each set of tables; and, secondly, a general, but not too condensed summary of the main results of the whole investigation. For example, we find in the report on mortgage indebtedness coördinate presentations of the following topics:—(1) the ratio of mortgage indebtedness to the true value of all taxed real estate; (2) a comparison of incumbrance with the value of the mortgaged acres; (3) a comparison of incumbrance with selling price; (4) a comparison of incumbrance with farm value, per acre. A better arrangement would be to make a general head of "the relation of incumbrance to value," and put the others as sub-topics. In this way their relations would be clearer, comparison would be easier, and the presentation could be made more concise. If a similar plan were followed wherever possible, and the suggested summaries of the principal results made, the volumes would doubtless be more serviceable to the average user of them. They present a kind of pathless wilderness of figures. A few pathways cut through them would introduce the orderliness of the well planned grove into the natural forest.

5. The diagrammatic presentation is, perhaps, unnecessarily profuse. Graphic representation of facts is, of course, sometimes necessary and nearly always helpful, especially if the statistics in a tabular arrangement do not readily and clearly show the relationships which they are intended to bring out. Numerous diagrams of

the character of those given here are more desirable in volumes with a wide popular circulation.[1]

III. THE VOLUME ON PROPRIETORSHIP AND INDEBTEDNESS OF FARMS AND HOMES.

The volume opens, as has already been pointed out, with a history of the movement which led to the investigation, a description of the plan for collecting the statistics, and an outline of the scope of the inquiry. This is followed first by the presentation and analysis of the facts of proprietorship, the word being used in the legal sense to include both owners and tenants, and then by the discussion of value and incumbrance and the interest on incumbrance. The next eighty pages are devoted to a description of the proprietors and lastly come the general tables, which occupy the second half of the volume.

Terminology.—The first question one asks in considering such a work as this is: Was the inquiry worth while? In the case of this investigation the question has special significance because of the fact that the same ground is already partly covered in another way by another portion of the census. The statistics of agriculture include the number of farms and their proprietorship. In that case the farm is the unit of investigation; in the present work, the family. Again, the statistics of population include a report on dwellings and families which presents for a portion of the subject, data of the same general kind as are given in the volume under discussion. In the one case the dwelling is the unit; in the other,

[1] As an illustration of such matter which adds but little to the worth of the report may be mentioned the diagrams which face page 122 of the volume on mortgages. However, this again, is a comparatively small matter, and is mentioned only in behalf of brevity.

the family. There is therefore in these various investigations more or less duplication of work and of results. While there may be some question whether all the necessary information concerning ownership and indebtedness could not have been gotten by the enumeration of "farms" and "dwellings and families," there is none, in the opinion of the reviewer, concerning the desirability of presenting that information in the form in which it is given in this volume,—that is to say, with the family as a unit. The value for sociological purposes of such a mode of presentation is very great. Whatever objection that unit is open to—and it is open to much—it is a better unit for estimating the economic and social conditions of the average American than an area called a farm, which may vary in extent from 5 acres to 1,000, and in value from $50 to $75,000; and for similar reasons better too, as a unit, than the "dwelling."

Although, however, the sociological advantage of presenting the data with the family as a unit is very great, objection may be made to the meaning of the term as defined in the census. A reader seeking information about the distribution of wealth would naturally turn to this volume in order to learn something about the ownership of property by individuals and families, as these words are familiarly used. Unfortunately, however, the editors of the report were hampered by having to use as a unit the term family in a technical sense already fixed for them by the census reports on population. Whatever fault is to be found with this use of the word, the editors cannot, therefore, be charged with it.[1] It is to be regretted that a classification of families was

[1] For the definition of a family in the Instructions to Enumerators, 1890, see above p. 62.

not given in connection with the figures on ownership. Such a classification as was made in the census of Massachusetts[1] in 1895 would have added much to the value of the work under discussion for all who looked to it for light on the matter of prosperity of our people. The Massachusetts report classifies families according to the number of persons in them, and gives the number of each class. For example, in North Adams we find that there were 550 families containing two persons each; 348 containing seven persons each, etc.[2] Of course, the addition of such a classification of "owning and occupying families" would increase the work of gathering and handling the returns, but not to any great extent, since such a classification is made for other purposes. At any rate much would be gained even if the classification were carried only so far as to enumerate occupants of hotels, almshouses, etc., by themselves so that they could be excluded from the total in calculating the percentages of owning families, etc. To be sure, "considered as regards great bodies of population the presence of these large 'census families' does not probably have any very appreciable effect on the average size of the normal family."[3] But it must vitiate the statistics for small political units, perhaps in some cases, for whole states.

Instructions to Enumerators.—There are several points in the instructions[4] on which there is at least room

[1] Mass. Census of 1895, 1 : 339–455.

[2] *Idem*, 1 : 387.

[3] Eleventh Census. Population, 1 : clxxxviii.[1] [1][Normal families and artificial or arbitrary families such as hotels, prisons, schools, camps, etc., were distinguished by the Mass. censuses of 1885 and 1895. The average size of the normal families was 4.45 persons in 1885 and 4.57 in 1895. The average size of all families was only .13 persons larger in 1885 and .08 persons larger in 1895.—W. F. W.]

[4] Eleventh Census. Farms and Homes, 5.

for a difference of opinion. The third one reads: "If a person owns and cultivates what has been two or more farms and all are not mortgaged, the several farms are to be counted as one farm and as mortgaged." If we remember that the unit of investigation is the family, this instruction is correct so far as it guards against the duplication of families in the returns. But when we come to consider the value and incumbrance of the farms reported as occupied by their owners, there is danger that obedience to this instruction may have swelled the figures in such a way as to be misleading. There are cases in the middle west in which a man who lives in town owns a farm which he supervises, leaving the immediate care to a salaried superintendent. The owner cultivates but does not occupy. He cannot be included among owning occupiers or among hiring occupiers. For the purpose of getting the total value of farms, the case is not different, if the owner lives on and cultivates one farm and owns and cultivates another in the manner described. The result of "lumping" the farms is that it swells the value of the owned and occupied farms and diminishes the apparent relative burden of incumbrance. In the seventh instruction we read: "If the same person owns and cultivates one farm and hires and cultivates another farm, he is to be entered upon the schedule as owning the farm he cultivates." In this case the hired farm would seem not to appear in the valuation of hired and occupied farms; while in the case previously described the farms owned and cultivated but not occupied would, as said, go to swell the total value of the owned and occupied farms. The result would be to diminish the total value of the hired and occupied farms relatively to the owned and occupied. It would seem that if the *hired*, cultivated, but not occupied farms

were not included in the sum of the values, the *owned*, cultivated, but not occupied farms should also have been excluded. Several of the instructions are so framed that while they avoid duplication of persons and families they either increase or diminish according to circumstances the value and incumbrance.

CRITICISM OF RESULTS PRESENTED.

Scope of the inquiry:—The purpose of the inquiry in the last resort, could be only to throw more light on the economic condition of our people. It is unfortunate, therefore, that its scope was not somewhat wider. Especially in the portion relating to value and incumbrance, the statistics are defective for any characterization of the welfare of the people of the country. No values are given for the homes of tenants nor for unincumbered homes occupied by owners; and on the other hand the incumbrance that is taken account of is that on farms and homes which are occupied by their owners. No account is taken of the incumbrance on hired farms and homes. The decision thus to limit the scope of the work makes the results obtained an imperfect guide for determining welfare. The report furnishes no means whereby we may know "whether hired farms are less or more valuable than those that are owned, nor whether farms and homes occupied by owners free of incumbrance are less or more valuable than those that are occupied by owners subject to incumbrance." To be sure, the report on mortgage indebtedness largely covers the omission, but this fact is perhaps to be regarded rather as a reason for the collation of the reports in one volume than as a reason for the omission of the information in the volume under review. The absence

of the information mentioned very largely impairs the interest of that portion of the report which deals with value and incumbrance. The other topics are presented with sufficient completeness. Much praise is due the editors for the judgment displayed in the selection of modes of grouping their information to bring out various conclusions. Especially valuable for their sociological teachings are the comparative tables of proprietorship in city and country, and between cities of different population, the record of the purposes of incumbrance, and the discussion of the character of the proprietors.

Ownership and Industrial Classification.—The grouping of the returns showing proprietorship of homes in cities according to their population might well have been supplemented with a short table giving the figures for cities of similar size but different industrial and social character in various parts of the country. For example, a comparison of proprietorship in a city like Lawrence, Mass., with that of such places as Peoria, Ill., and Lincoln, Neb., should throw some light on the comparative progress of the industrial and social classes which predominate in these different places. It would furnish some answer to the question what classes in the community constitute most largely the home owners. It is not infrequently said in some places that the wage earners are to a large extent the owners of their homes. While this is true in certain localities it is probably very far from the truth in most. In the absence of statistics for the separate industrial classes such a comparison as is suggested would help to answer the question. According to a statement in the report it was at first planned to gather the data for the separate classes, but the expense was prohibitive.

Ownership and Density of Population.—The discussion of the relation between farm tenancy and density of population is in some respects obscure because of the varying size of the farms.[1] This is a defect in Table 16. A comparison might fairly be made between places in which the owners cultivate farms of about the same size. No fair comparison of density of population in different places can be made unless the areas are approximately equal. A comparison, for example, of the ratios between tenancy or proprietorship and density of population in states like Arizona and Illinois can hardly be of much value. For, in the first place, as already remarked, the areas are not equal; and, in the second place, the whole extent of one state is available for occupancy while of the other only a portion is habitable.

In presenting the returns groupings are made to illustrate some points which are hardly important enough to be elaborated. One of these has already been mentioned, namely, the record of land sales in Massachusetts. The remark applies with more or less force to the treatment of farm and home purchase as financial operations.[2]

Ownership and Loan Associations.—A discussion is given of the relation of proprietorship to the prevalence of building and loan associations.[3] Its purpose is to throw light upon the question whether the ownership of homes has been especially dependent on the establishment of these associations or whether homes would have been acquired had there been no associations of this sort. In order to determine this point we need figures showing whether, in places where building and loan associations are prevalent and borrowers numerous,

[1] *Idem*, 41,f.
[2] *Idem*, 42, 47.
[3] *Idem*, 47–51.

the percentage of home-owning families is high; and also whether, in places of similar social character but without building and loan associations, the percentage of home-owning families is small. The tables give us only the percentage of home families occupying hired homes, the number of borrowers, and the percentage of borrowers of families. They cannot, therefore, be of much help in settling the question, for, in the first place, there are too many other sources whence intending home builders can now secure loans, and these sources are altogether unknown both as to character and amount; and, in the second place, building and loan associations are as likely to be a result as a cause of demand for houses, and they would be established in a community where they were not already in existence, only when other sources of loans were absent or strictly conditioned.

Tenancy and Sales.—In passing it may be noticed incidentally that tables like the one given, showing the average population to each deed of real estate in Massachusetts from 1880 to 1889,[1] really show us nothing as to the high or low degree of tenancy. It is argued that "if real estate changes ownership infrequently, the inference may be either that the real estate is so cheap as to be undesirable or else so valuable as to be beyond the reach of the masses of the people with respect to ownership. On the other hand, if the transfers are frequent the inference may be that the ownership of real estate is easily obtainable."[2] But investments in real estate depend on other causes than the desire of people to own their own homes. They depend, for example, on the rates of re-

[1] *Idem*, 53, Table 21.
[2] *Idem*, 52.

turn from other investments; on the general condition of business; and, possibly, on peculiar local conditions, which may or may not make real estate ownership profitable. For these reasons it is doubtful whether the table deserves even the small space assigned to it.

Interest.—Still further, it is very doubtful whether the facts presented under the head of interest charge are very reliable. "The rates were reported mostly by the debtors, except that reports were obtained mostly from county officers in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia,"—that is, in one-fourth of the states of the country.[1] The question called for the actual rate of interest or "what the use of the money has cost regardless of what the contract may specify." In the opinion of the editors, if there is any error in the report of the interest rate it is a failure to make it as high as it really is. Their ground for this belief is that "mortgage contracts are often somewhat complicated in respect to the rate of interest, and all debtors have not education enough to enable them to compute the real rate of interest borne by the contract as distinguished from the standard rate under the law of the state."[2] Where the interest was not given, the editors applied the average for the neighborhood; where the principal of the debt was obviously too large, they deducted an amount equal to what the interest would have been on the basis of the rate prevalent in the neighborhood. It is probably a fact that debtors in attempting to give "what the money has cost" regardless of the stipulated rate of interest, would assign a figure too high, for men

[1] *Idem*, 103.
[2] *Ibid.*

tend to exaggerate such burdens. In many transactions, moreover, there would be no payment of the nature of interest, yet interest would be virtually paid. In some parts of the south, for example, farmers give mortgages on their farms, sometimes on their crops, to merchants in order to secure advances. They really pay their interest in higher prices, and reliable information shows that these prices range all the way from thirty to one hundred per cent higher than they would be if the customers were not in debt to the merchants. This statement applies to real estate mortgages as well as to certain other forms of incumbrance. Of course these draw-backs or defects are not a reason why an effort should not be made to determine the actual rate of interest regardless of the contract rate, but they show that the effort must be performed with great caution and that however carefully it is done it is likely to be considerably wide of the truth. The various modes of presenting the facts about interest charges seem to cover the ground very thoroughly.

Description of Proprietors.—Not the least interesting part of this whole report is the detailed description of proprietors.[1] The main divisions of the presentation are by color, place of birth, age and sex. The value of this portion of the work would be very much enhanced by such a summary as has already been suggested, for the multiplicity of different details is really bewildering.

The record of incumbrance is seriously affected by the failure to secure adequate information on crop liens. We are told that "the enumerators were instructed to regard crop liens as incumbrances on farms, but they overlooked the instruction, with hardly an exception, in the districts where crop liens were in force."[2] It is to

[1] *Idem*, 163–242.

[2] *Idem*, 14.

be hoped that this defect will be remedied in another investigation. In this connection it should be noted that all data of indebtedness other than debts of record are likely to be of doubtful value unless very carefully investigated.

Reports of values by public officials and by owners had to be relied upon very frequently. It might be possible in many cases to check such replies by getting a record of recent sales in the neighborhood. This would add but little to the labor of the enumerators. In conclusion it is scarcely necessary to say that the logical soundness of methods adopted for the calculation of averages, wherever that has been necessary to supply the places of unknown quantities, is unimpeachable and the mathematical accuracy of the operations is admirable. Careful search has failed to discover any error of importance.

IV. REAL ESTATE MORTGAGES.

Value of Investigation.—Seldom has any piece of statistical work been put forth of so high an order of merit as this volume. It is superior in the skill of its plan and execution to the work of the volume on farm and home proprietorship. The difficulties surrounding the acquisition of the data were more numerous and serious than in the case of the other volume; and the statistical skill shown in their manipulation is, if anything, greater. Several of the general criticisms which have been made are applicable to this report as well as to the other. There is not much room for criticism either of the statistical method employed or of the details of their application. Some points, however, must be noticed.

Scope and Plan.—This volume gives a more complete return of the landed indebtedness than does the report on proprietorship because it includes incumbrance not only on farms and homes occupied by their owners, but also on those occupied by tenants. The introduction describes the plan of investigation. A brief account is given of the several methods of inquiry into this subject, which have been made at various times and in various places, in order to set forth the merit of the plan finally adopted. That plan was to investigate real estate mortgages for the whole country, to find the mortgage movement during the preceding ten years by counties, the average life of mortgages, etc. The time available for the prosecution of the inquiry was so short that investigation by special agents was impossible, even if the expense of that method had not put it out of the question. The public records, therefore, had to be chosen as the main source of information. Obviously, however, these could not be relied on. In order to secure a check upon them, one hundred and two counties in various parts of the country were selected, and in these the amount of indebtedness was determined both from the public records and by personal inquiry. The proportion of error shown by the accurately determined returns, in the public records of these one hundred and two counties was used as a basis for correcting the errors of the record for the whole country. The success of the inquiry is very gratifying not only because of the interest attaching to the work, but because it has at last demonstrated, in the words of the editors, "that a statistical office in the United States . . . . can determine the amount of the existing 'recorded indebtedness of private corporations and individuals' by direct methods, as certainly for crop liens,

chattel mortgages, judgments, etc., as for real estate mortgages."

To a clear understanding of the work of the volume it is necessary to explain briefly the process of establishing the amount of existing debt. If the same number of mortgages were made every year, the debt incurred within a period equal to the average life of the mortgages would be the actual debt at any given date. But the conditions are not uniform. Different numbers of mortgages are made every year. In order to get a mathematically representative mortgage we must have an equation of the time with the debt incurred. For instance, "a mortgage for $500 enduring for five years, and one for $1000 enduring for two years, are equivalent to one mortgage of $1500 enduring for three years, when an equation of time and debt is established."[1] When we have determined the life of mortgage debt for a section we are able to say that one mortgage equal to the sum of all the mortgages actually made during each year, was made at a certain time of the year to endure for the period of average life of mortgages. At any given time, therefore, the existing mortgage debt, if no partial payments are made, is the sum of the debts incurred during the average life period, exclusive of those left unpaid from preceding life periods. The amount to be allowed on the average for partial payments was ascertained in the one hundred and two counties before mentioned. "The process then . . . . consists simply in deducting from the original amount of the mortgages made during a period equal to the average life of mortgages in each county the amount of the partial payments made on all existing mortgages.[2]

[1] Eleventh Census. Real Estate Mortgages, 15.
[2] *Idem*, 16.

Results Presented.—Before proceeding to discuss the application of this method and its errors, we must review briefly the field covered. The first presentation of returns is the mortgage movement for ten years, showing the variations in the number and amount of real estate mortgages in various connections. Separate classification is made of state and railroad contracts, and mortgages are classified by their amounts. The data are used to get certain averages which are applied to the various states and territories by years to show the normal variation.[1] The next topic presented is the amount of mortgage indebtedness in force on January 1, 1890, and the increase in mortgage debt from time to time.[2] This is followed by a comparison of the mortgage indebtedness with the total value of real estate.[3] Various relations are ascertained between mortgages and population,[4] and the subject of interest is then taken up at great length.[5] A detailed account of the special investigation in the one hundred and two counties, the data for which were accurately ascertained, is given,[6] and followed by a short account of mortgages in foreign countries.[7] Four pages are then devoted to a summary of the results,[8] a feature which greatly increases the value of the volume.

Criticism of Application of Mathematical Theory.—Let us return now to a consideration of the plan adopted for the establishment of the amount of the existing mortgage debt. Although the process as explained is mathematically correct, there are certain conditions

[1] *Idem*, 25–84.
[2] *Idem*, 87–111.
[3] *Idem*, 115–152.
[4] *Idem*, 157–163.
[5] *Idem*, 167–265.
[6] *Idem*, 269–295.
[7] *Idem*, 299–305.
[8] *Idem*, 309–313.

which interfere with its accuracy when it is applied. The life of mortgages as shown by the records does not tally with their true life, allowance has to be made for partial payments, and there is great variation in different places, both in the number and amount of mortgages made from year to year. "Where the number and amount of mortgages made each year are small and highly variable," a large percentage of error may appear in computing the amount of the existing debt.[1] There is no way of obviating this, but for areas larger than a state the error cannot be very great. In order to determine the allowance to be made for partial payments, reliance was made upon the returns received from the one hundred and two selected counties. The investigators ascertained the debt actually on the records in these counties, and then computed the debt for the same date by the mathematical method before described. They then found the difference, and the "percentage of error of excess or deficiency of computed debt" which this difference represented.[2] The theory was that there would be practically as many errors in the over-estimation of values as in the under-estimation, and that these over-valuations and under-valuations would practically off-set one another, so that the average error between the computed and recorded values of mortgages in these one hundred and two counties could be applied to the various states and to the whole country. The theory of course is sound, but the practical value of the method depends, in the last resort, on the number of cases from which the average error is deduced. It is not enough to have a series of instances in which the errors of excess or deficiency in the computed

[1] *Idem*, 16.
[2] *Idem*, 17,ff. Table 1.

debt off-set one another; regard must be had also to the amount of variation between the different percentages of error. The larger the off-setting percentages are, even although they exactly off-set one another, the less reliable is the resulting average for application to unknown cases. A close determination of the mean error would theoretically require a very large number of cases and it is of course impracticable to secure this. Still, a number larger than one hundred and two is desirable. A number of counties not less than five for each state, should be chosen so distributed that they will represent the variations in the industrial conditions of the state.

Moreover, the more variable the total incumbrances (that is, the larger the differences between them) whose percentages of error off-set one another, the less reliable is the resulting average. For a small incumbrance in one or two of the sample counties may be representative of the majority and yet be over-balanced by another of the sample counties with a high total value and a high percentage of error, or *vice versa*. In other words, if we use only two counties in the state, the error in a county with a large value and debt practically determines the error for the state, even if the error of counties with small value and debt would be more representative of the majority of its counties. Indiana, for example, shows an error of only — 2.69 per cent on lots, and yet the different counties show errors varying from — 39.59 to + 18.03. In every case where the selected counties yield such a result, the test should be extended to two or three other counties in the state.

Still further, the counties chosen should not be too near one another. Those selected for Alabama are open

to criticism in this respect as well as on the point just discussed for Indiana. The two counties selected in that state are Green and Jefferson. They are separated only by one county, Tuscaloosa. The average value of the farm acre in Jefferson is given as $10.81 and in Green as $5.55. There are only two counties in the state with an acre value of $10 or more, while there are thirty-seven with an acre value of less than $5.55. Unless care is exercised to meet the conditions described, the average error is very likely to be unreliable not only for separate counties but for a whole state.

Various Points.—The results obtained are admirably presented. Perhaps the most interesting portions are "A Decade of Mortgages", showing the mortgage movement from 1880; the "Interest on Mortgage Debt"; and the results of the "Special Investigations in One Hundred and Two Counties." The presentation of mortgages in relation to real estate value and area is open to the same criticism that was made on the parallel presentation in the volume on farms and homes. The topical arrangement of this division is bad because the headings are not properly subordinated, and the lessons to be derived from the data are not of very great value. The principal reason for this is to be found, of course, in the fact that but little reliance can be placed upon the reputed values of acres and of lots. This fact is recognized, so far as lots are concerned, and no attempt is made to establish their value. The effort to do so for acres is aided, in this case, by the fact that there were available some data showing the average price of an acre sold for a series of years in Ohio, and for sundry years in Illinois, Minnesota and Wisconsin. The effort to present a proportion between mortgage indebtedness

and selling price is based on a more solid foundation, for records of recent sales are not very difficult to get.

A word may be said about the admirable series of averages presented for amounts of mortgages, the life of mortgages, rates of interest, etc. It is not uncommonly said that an average is of little value because it is so likely to be merely typical. This is by no means to be taken as a matter of course, as Mr. Holmes has shown in another place.[1] The averages here mentioned, especially for interest rates, are really valuable and representative.

Of as little reliability as the figures showing the relations between acre values and mortgages are also, to a large extent, those dealing with population and mortgages. The table, showing the number of persons to a mortgage,[2] is of little use. The point of interest is to determine the burden of mortgages. That depends on the number of mortgages, the number of mortgagees, the value of the property, and the amount of the mortgage. The proportion of population to number of mortgages tells us little, if anything, about this burden. If the rate of increase of the population is greater than that of mortgages the change in the burden of indebtedness is not shown by the percentages given. The table would have been more valuable if it had shown the percentage of growth of mortgage indebtedness per capita as compared with the percentage of growth of population for a series of years.

There is really little else in the volume to criticise. It would be an improvement if the summary of results had been extended. A four page résumé of so large a volume is too condensed to be of much value.

[1] Am. Stat. Ass'n. *Publications* 2 : 421 (1891).

[2] Real Estate Mortgages, 158.

Future investigations should secure information about crop liens. These in the south take the place of real estate mortgages, and the real burden of the debt among the farming class in that section of the country is not shown in the report because of the omission of data concerning them. Indeed, to those who are not acquainted with the peculiar habits of the southern farmers the report in this particular is misleading, for it shows no considerable burden of indebtedness in the southern states. It is true that this subject was well considered by the editors of the volume and they decided that the cost of including these liens would have been too great and the result too unreliable. These reasons are of more force in the case of such things as chattel mortgages and court judgments than of crop liens, and it is to be hoped that the way will be made clear to include the latter. They really are real estate mortgages.

V. CONCLUSIONS.

In conclusion, I would reiterate my belief that the inquiry can be successfully carried out and ought to be repeated. The difficulty of doing it once in a decade emphasizes the desirabilty of a permanent census bureau. A single investigation is of little value. The value of the investigation, whatever it is, depends upon the continuance or repetition of such inquiries in order that comparisons may be made from time to time, and the trend of the phenomena be more clearly set forth.

The regular census enumerators might safely be entrusted with the collection of facts regarding proprietorship and tenancy so far as necessary to determine:

a. Whether the farm cultivated or the home occupied is owned or rented;

b. Description of the "family."

Finally, as has been said already, the facts of the two volumes might well be presented in smaller compass. This could easily be done if the superfluous presentations in the way of unnecessary groupings to elucidate special points were reduced, the graphic presentations lessened in number, and certain unnecessary tables which have been mentioned omitted. The facts concerning ownership and tenancy should, however, be presented separately from those on *debt*, even if included in the same volume.

The success of the special agents in the southern states in doing work supplementary to the enumerators emphasizes the value of such special agents for the entire country. I do not believe that the expense would be an insuperable obstacle. Agents could be selected who are residents of the various states and more or less familiar with the conditions in their neighboring counties. They should be, so far as possible, legally trained. It is especially desirable to have such agents if it is intended to secure complete returns on the value of farms and the amount of debt, rates of interest and objects of debt. The *fact* of incumbrance can be easily secured by the ordinary enumerators.

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TRANSPORTATION.

The Statistics of Transportation.

For most, if not all branches of transportation, both annual and decennial statistical reports should be provided. There is no subject concerning which the public has greater need to keep informed. When the transportation service is not performed directly by the state, it is conducted by corporations which are chartered by the government and which in the intererest of the public welfare, must be regulated by public authority. The government is also appropriating large sums of money to facilitate transportation, particularly that by water, and this constitutes an added reason why the transportation statistics should be made complete and should be collected regularly and frequently.

At the present time we do not annually collect statistics of our inland or coast-wise commerce or of our express and telegraph business. Yet the public regulation of railways and the intelligent appropriation of money for river and harbor improvements require such a knowledge of all these branches of transportation, with the exception of the telegraph, as can be had only by means of an annual collection of statistics.

The annual and decennial presentations should differ both in scope and character. The decennial compilation should be more detailed than the annual, and should make those comparisons needed to present the progress and evolution that is taking place in the various transportation agencies and services.

The transportation statistics of the eleventh census covered the coast-wise and inland water commerce of

the United States and the business done by our railroad, street railway and express companies. It was comparatively easy for the census officials to secure the statistics of steam railroad transportation because nearly all of the data desired from the railroad companies for the census are annually submitted to the Interstate Commerce Commission. In the case of coastwise and inland commerce, however, the only data published annually by the government are the tonnage statistics contained in the report of the United States Commissioner of Navigation. Carriers by water are not required to report their business annually, and to a large extent they carry on their business without the extensive organization which prevails in railway transportation. To obtain the census statistics of transportation by water, especially the statistics of inland navigation, was consequently more difficult than to obtain those of transportation by rail. The fact that there were no annual statistics of inland and coast-wise water transportation made the necessity for census statistics all the more urgent, and the census volume on Transportation by Water gives evidence of conscientious effort, put forth under good guidance, to secure the desirable data. It was impossible to secure complete statistics and doubtless there are many errors in those given. Indeed it will not be possible to secure full and reliable statistics of inland navigation until Congress compels carriers by water to keep a record of their business and make regular reports to the government.

The business of the express companies is well presented in the eleventh census. Unfortunately the statistics do not include quite all the express business done in this country, because one foreign corporation refused to furnish the information requested of it. This is

something whose recurrence can easily be prevented by legislation. If the express companies were obliged, as they should be, to make annual reports to the Interstate Commerce Commission, not only would the annual statistical volume published by that body give a more complete presentation of our transportation business by rail, but the decennial presentation of the express business could also be made much more valuable.

At the present time the Interstate Commerce Commission collects annual statistics of railroad transportation, and the Bureau of Statistics in the Treasury Department collects full statistics concerning our foreign commerce. The United States Commissioner of Navigation, also connected with the Treasury Department, in his annual report gives the statistics of the tonnage of vessels engaged in the foreign and domestic commerce of the United States. It is recommended that the Interstate Commerce Commission be instructed by Congress to collect annual statistics of all carriers by water, of the business of express companies and of telegraph companies. The statistics of our coast-wise commerce could be collected and published most advantageously by the Bureau of Statistics of the Treasury Department if the statute outlining the powers of the Bureau were so amended as include this function among its duties. The Interstate Commerce Commission and the Bureau of Statistics in the Treasury Department now have statistical machinery which can readily assume the added work of collecting the statistics here recommended.

Besides these annual statistics, both the Commission and the Bureau of Statistics referred to should publish decennially statistical volumes covering the work that has been done in the past by the census. These decen-

nial statistical presentations are of great value to the government and to students of industrial and social affairs, and when collected and published, as here suggested, they would be more accurate and more scientific in character than those given in such an enumeration as the census has presented. The additional cost involved in the decennial compilation by the existing bureaus would also be much less than that which would be incurred by the census authorities in performing the same work. There is every reason, then, both from the standpoint of a scientific statistical presentation and from that of economy, to favor the enlargement of the statistical work of these two bureaus.

As regards the statistics which the national government should collect in the future concerning street railway transportation, the time has probably not yet arrived for an annual compilation. The business of street railways is still mainly local and fairly distinct from the traffic done on steam railroads. The business of the two agents, however, is beginning to be less sharply separated and there is every indication that the electric railways are soon to enter very largely into the traffic operations now carried on by the steam railroads. There are already many inter-urban electric lines and some of them are interstate roads. For the present, however, it would seem best that the several states should collect annual statistics of street railways. Some states now do so, but the majority do not. If the states during the coming decade should not provide for the annual statistics, the United States should then undertake the work. Doubtless by that time, also, the inter-urban and interstate character of the street railway business will have developed to such a degree as to render

necessary an annual collection of statistics by the federal government.

Concerning the desirability of a national decennial presentation of street railway statistics, there can be no question. Those who have occasion to use such statistics fully appreciate the value of the volume on the statistics of street railways that was included in the eleventh census. A similar collection should be made in 1900, by the statistical department of the Interstate Commerce Commission. This and the other recommendations made in this report will, of course, add largely to the work of that department of the Interstate Commerce Commission, and larger appropriations to that department may be necessary. The Interstate Commerce Commission, however, can do the work more cheaply and more accurately than could any improvised statistical force.

The census statistics of transportation by steam railroads in 1890 were taken under very favorable circumstances, and it will be best to devote the remaining and greater portion of this report to a criticism of the railway statistics. The criticism will refer to the eleventh census and will contain certain suggestions touching the scope and character of the material that the future decennial compilations should contain.

In discussing the problem of the scope and method of railway statistics in the transportation volumes of the United States census, two questions present themselves. The first and more important is, what railway statistics can and should be presented to the public; and, secondly, what part of these statistics should be presented decennially and what in the annual statistical report of the Interstate Commerce Commission? It will be best to consider the second question first.

Both investigations, the eleventh census and the annual report of the Interstate Commerce Commission, seek to give a clear idea of the mileage and equipment, the capital, earnings and expenses, the *personnel*, number of accidents, etc., upon American railways, and both cover the ground in much the same manner.

It would be well in the future to co-ordinate more closely the annual and decennial reports. This does not mean, however, that what is printed in one must necessarily be excluded from the other. A large part of the data furnished by the Commission's annual statistical report might be given in an abridged form in the decennial volume. The chief purpose of the latter, however, should be to present the changes that have occurred during the preceding ten years. The annual volume should concern itself more with the changing features of the railway situation, while the decennial publication should go with greater detail into those features which are less mutable and more permanent in character.

The following are a few of the investigations with which a decennial volume to be prepared in 1900 might concern itself. A study might be made of the more technical side of the railways. The volume might furnish us with detailed statistics of gauge, curves, and gradients upon the different lines, the proportion of steel rails, the weight of the rails, the composition of the ties, the number, cost and general character of stations, a more detailed account of the locomotives and other rolling stock, and a number of other facts which are intrinsically interesting and which throw considerable light upon questions concerned with the cost of operation. Statistics of this sort are apparently better adapted to the decennial than to the annual publication, as they do not change so rapidly as does, for instance, the in-

come or expense account, and a decennial comparison would suffice to give a general idea of the railway development along these lines.

Another feature of this decennial report should be a presentation of the statistics of commodity ton-mileage. The eleventh census contained a general, but rather unsatisfactory, statement of the chief classes of commodities carried. Fourteen groups of commodities were singled out; but these accounted for little less than three-fifths of the total tonnage of the roads considered, and only tons and not ton-mileage figures were given. While the railways might possibly consider that a yearly statement of the ton-mileage of each commodity would involve an unreasonable amount of work, until less expensive methods of railway auditing are introduced, such a grievance could not be based upon a requirement to make a decennial report. These statistics would not be without value. They would show the localization of industries in various parts of the country as well as the trend of traffic from one kind of commodity to another, data which would have an important bearing upon the question of reasonableness of rates.

With reference to the general method of presentation of railway statistics, some changes seem desirable. While certain fundamental facts should be presented about all railways, it might be advisable to give in greater detail the results for a limited number of large roads instead of devoting considerable space to details of insignificant, although independent, railways. It is more important to have special information concerning a railway with ten thousand employees than to be furnished with general statements concerning lines employing one hundred men. It would be invidious and probably inadvisable to demand information from one

line that was not required of another, but the plan might be adopted of printing detailed information for the hundred largest railways, while filing the material presented by smaller railways.

The freight traffic statistics, both in the annual and decennial reports, might be divided not only into local and through business, but into intra-state and inter-state traffic. These statistics would be comparatively easy to furnish from the way-bills, and would be valuable in connection with questions of taxation, state control, etc.

The reports might also furnish statistics of car-miles. We now have train-mile and passenger — and ton-mile statistics, but the connecting link, car-miles, is missing. These statistics are easily obtainable and would be of importance in connection with questions of utilization of rolling stock, number of persons or of tons per car in various kinds of traffic, length of trains, etc. There are numerous practical questions of railway economy, upon which light would be thrown by the publication of car-mile statistics. Statistics of car-capacity might also be valuable in connection with questions of car load rates.

The wage statistics of railway employees might also be profitably incorporated into the decennial volume, and the present labor statistics contained in the Commission's Statistical Report might be somewhat remodelled and altered. Not only the average wages should be given, but also the number of employees in each of a number of wage classes should be presented, and it is equally advisable that the classification should be made more detailed and the groups more definite. The census reports of the future might also contain statistics of the hours of labor for the various groups of employees, similar to the statistics obtainable for Prussia or Saxony.

The question of capitalization and increase of capital of railways should be carefully considered in preparing the decennial report. There is probably nothing in the whole field of railway statistics, with the possible exception of those of "injuries in accidents", so inconclusive as the statistics of capitalization. The capital account of American railways presented by the official statistics means neither the amount spent on the construction of the railways, nor the total amount contributed by all parties, including the National, state and local governments, nor the cost of purchase of the railways, nor their present value, nor anything of real significance. To say that the capital account of American railways is some eleven thousand millions of dollars is to make a statement that has little economic value. A capital account of a million dollars may mean an investment of two millions or of five hundred thousand dollars, and the capital account may be doubled or halved without there being any increase or diminution of the real investment.

The lack of meaning in the statistics of capitalization could be overlooked, if it did not lead to their being given a false interpretation. The publication of capitalization statistics, which, whatever their relation to actual investment, are far in excess of the value of the railways, leads foreign and home critics to false conclusions and serves as a basis for many specious arguments and incorrect judgments. So general are the erroneous impressions derived from these statistics, that we might almost be tempted to consider it preferable to suppress the whole body of statistics of capital, on the ground of insufficiency of data.

If the present statistics of capitalization are retained, and we think on the whole that they should be, some

attempt should be made by the Commission in both annual and decennial reports to rectify the false impression which such statistics give. Such a correction might possibly be obtained by a table showing in parallel columns the market value of such of the stocks as are quoted, and the par value of the same securities. It would also be well to follow the example of the English reports in showing from year to year the increase in the capital account that is real and the increase that is nominal, in other words, that which is due to conversions, consolidations, etc. Such facts would give the public some conception of the actual amount of capital invested during the last year or decade, and some conception also of the actual present value of railway property.

In general the recommendations of this report are, that the Interstate Commerce Commission should be empowered and instructed to collect annually statistics not only of steam railway traffic but also of the business of inland water transportation, and of express and telegraph companies. The Bureau of Statistics in the Treasury Department, besides publishing statistics of foreign commerce, should also be instructed to publish annually statistics of our coast-wise traffic. In the future, both of these agencies should publish decennial statistical reports which should take the place of the presentation contained in the eleventh census. The decennial collection of the statistics of street railways should be made by the Interstate Commerce Commission. The decennial volumes should contain those details concerning which annual reports are not necessary but which properly belong in a decennial and comparative presentation. The relation which the annual and decennial reports of steam railway transportation should bear to

each other are indicated in this report. It seems hardly necessary to discuss here each branch of transportation in a similar manner.

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MANUFACTURES.

Manufactures in the Federal Census.

The statistics of manufactures are among the weakest in the whole range of census reports, although more carefully compiled than most. They are subject to more limitations, and are susceptible of more misleading interpretations than any other group. As a statistical photograph of facts, they are inadequate and defective, though perhaps not more so than other branches of census work.

This is the more to be regretted because of the intimate relation which the manufacturing statistics bear, or are supposed to bear, to modern sociological study. In the series of problems which increasingly occupy public attention,—those which have to do with the relations of labor and capital and the contention of individualism *vs.* collectivism,—these statistics are incessantly drawn upon to enforce the argument of one side or the other. Such is their construction that either side can prove from them, or thinks it can prove, practically any proposition it chooses to advance.

Thus our manufacturing statistics are reservoirs of popular error. Without a full understanding of their limitations, it is impossible to avoid falling into misconception. Notwithstanding the frequent sign-posts and danger-signals scattered through the text, economists, public writers, legislators, and propagandists of every sort persist in reading them awry; and we may assume that most of them are honest in so doing.

It is necessary to add that some compilers of manufacturing statistics set the fashion by reading into them,

through derivative tables and percentages, certain relationships which the methods of compilation do not warrant. Any subsidiary calculation which contains an element of error—not an error in original data or computation, but an error in principle—is one that ought never to be made in an official census.

Some of the limitations upon the value of manufacting statistics can be remedied, in a degree at least, and some of them at present appear to be hopeless.

Two things may encourage us in spite of this outlook. One is the fact that, defective as they are, our manufacturing statistics are the best produced in any country; the other is the fact that since 1860 they have steadily improved from decade to decade.

The difficulties surrounding a complete census of manufactures are so appalling that they have thus far deterred any of the great manufacturing nations of Europe from attempting the work on any comprehensive scale like our own. These difficulties have never in the least degree phased or made to falter the ambitious statisticians of our own country; and manufacting statistics have so multiplied of late years, through the compilations of our increasing number of state bureaus of labor statistics, that it appears timely to study their methods and limitations, to point out some of their defects, and to measure their intrinsic value as guides to definite conclusions in practical affairs, in legislation and in social movement.

I. The Earlier Censuses of Manufactures.

The industrial census of the nation was first undertaken in 1810, on the recommendation of Secretary Gallatin in his Report on Manufactures. Congress had no conception of the difficulties of the task it ordained.

This first industrial census was taken without even the formality of a schedule, or definite instructions to the marshals, and necessarily it forms no true measure of the industrial resources of the country at that time. Whatever utility the figures possess was imparted by Tench Coxe, who was appointed by the Secretary of the Treasury to digest the returns and make out of them such showing as he could.

Of the $198,613,471 reported as the value of products, more than 60 per cent was estimated by Mr. Coxe. While the statistical value of such an estimate is doubtful, it does nevertheless afford a definite starting-point, undoubtedly conservative, from which our subsequent growth can be approximately measured, precisely as the growth of English wealth and resources is measured from Domesday Book.

The industrial census of 1820, although conducted on a schedule which contained the principal questions of present inquiry, was even more unsatisfactory than that of 1810, partly, according to Mr. Bishop,[1] "on account of the inadequate compensation allowed the enumerators, and partly from the inability or reluctance of manufacturers to give details of their business." The digest of the returns prepared in the office of the Secretary of State was so imperfect an exhibit that the Secretary was only constrained to permit its publication by the imperative nature of the resolution of Congress calling for it. A subsequent resolution providing for its distribution was tabled. On this account the document has come to possess some value to bibliophiles as a rare bit of Americana, but it has none to the statistician.

The value of manufactured articles returned was

[1] J. Leander Bishop, "A History of American Manufactures," 3 : 263. (1868.)

$32,271,984, just about one-sixth of the product reported ten years earlier. The decrease, Mr. Bishop explains, was in part due to "the omission of all manufactures strictly domestic or household." Another explanation was the failure to secure the services of a man like Tench Coxe, capable of reading into the figures some of the data which the enumerators left out.

This experience led to the abandonment of any attempt to take an industrial census in 1830.

The census of 1840 was little better than its predecessors. "We are astonished as well as embarrassed," says Mr. Bishop, "by the meagerness of its details. Even of the leading branches in some instances only the capital is given; in others only the product; and we confess we do not know by what rule of arithmetic or mensuration any one could have calculated from official data that the capital invested in manufactures at that time was $267,726,579." The report itself does not attempt to aggregate the value of the products returned; in a number of the leading industries, such as flour and grist mills, cast iron, liquors, powder, etc., only the quantities are returned; when we come to cast up the account for ourselves, making our own estimates, we find the aggregate so relatively small that we suspect it affords the explanation of the absence of any attempt at an official total.

General Walker declares that the results of the manufacturing census of 1840 are "worthy of little consideration;" and he adds that it is "from the census of 1850 that official information on this subject may be said to begin."[1] Mr. Bishop also declares that the seventh census, which was taken under the direction of J. D. B. DeBow, was the first in which "the government attempted to ascertain with an approach to accuracy the

[1] Encyclopædia Britannica, article "United States," 824,f.

exact development of the productive industry of the country, not counting any establishments that did not produce $500 per year." "The astounding fact was revealed," adds Bishop, "that the capital invested in manufactures exceeded $550,000,000, and the annual product had reached $1,019,106,616."

The census of 1860, which reported products of the value of $1,885,861,676, adds "a moderate estimate for omissions and for non-return of minor and inconsiderable establishments," which brings the total up to $2,000,000,000, or an increase of $980,894,000 in ten years.

The census of 1870 was taken under the law of 1850, and Superintendent Walker was not long in discovering that the original returns were so defective as to be in the nature of a burlesque upon accuracy. The result was a re-enumeration of five of the chief cities and of many smaller ones, which added $250,000,000 to the gross product originally reported. He then balanced accounts between the eighth and ninth censuses, adding or subtracting the industries covered in one and not the other, in the following manner:[1]

Total production of the United States, 1870, as reported		$4,232,325,442
Add on account of cotton-ginning, etc. (omitted)	$65,753,323	
Mining, pure, "	82,016,061	
Quarrying, "	11,860,622	
Fisheries, "	11,096,522	
		170,726,528
		$4,403,051,970
Deduct on account of butchering	$13,686,061	
Value of cloth printed	36,838,007	
Increase in reported production of carpenters, coopers, etc.	177,569,242	
Increase due to re-enumeration	250,000,000	
		478,093,310
		$3,924,958,660
Total production of the United States, 1860, as published		1,885,861,676
Increase in 10 years, 108.12 per cent		$2,039,096,984

[1] Ninth Census, Wealth and Industry, 378, f.

I reproduce this table for the purpose of illustrating how enormous is the variation, from census to census, in the basis or sub-structure of the manufacturing statistics, and how dangerous it is to attempt any such tables of comparative increase, or percentage of increase, as that which appears in the volume on Manufactures for 1890.[1] The fact is that there have never yet been two censuses of manufactures taken which are properly comparable by the percentage method, either as a whole or in any of their elements.

General Walker, further commenting upon the manufacturing statistics of the census of 1870,[2] said:

"If the reported gross product, $1,885,861,676, at 1860, had been correct (as it manifestly was not), about 3,925 millions of dollars would have been the true expression for the gross product of 1870. On the other hand were the reported gross product of 1870, $4,232,325,442, correct (and it is manifestly below the facts of the case), about 2,030 millions of dollars would have been a just statement of the product of 1860. If, again, the product of 1870 were to be increased (as it clearly ought) by a sum exceeding $600,000,000 on account of the omissions and deficiencies which have been previously noted, the product of 1860 would stand at about 2,325 millions of dollars, while the product of 1870 reached $4,839,090,670."

These curious computations and readjustments show how little intrinsic value, for scientific statistical purposes, has been assigned to the totals of the census of manufactures, by those who are familiar with them from the inside.

The greatest step in advance was at the census of

[1] Eleventh Census, Manufacturing Industries, I · 4.
[2] Ninth Census, *Ibid.*

1880, when the modern method of enumeration and supervision was first employed, and General Walker applied the system of special agents, first in the collection of data, and then in their presentation by industries under the supervision of experts. The reports of this census are consequently the first, in the substantial accuracy of which we can have much confidence. Both these improvements were continued and perfected under the census of 1890. It is difficult to understand the grounds upon which Congress now proposes to deprive the census director of the advisory services of experts, in the preparation, compilation and interpretation of the statistics of the great industries. It is certain that this work cannot be satisfactorily performed by the average census clerk, having no knowledge of the technical significance and the logical relation of the figures with which he is dealing. It is certain that the Census Office cannot command, for the salary of clerks, capable experts willing to surrender permanent vocations for temporary service. That there have been abuses of the special agency system is known to us all; but it would seem to be an easy matter so to guard a provision of law authorizing them as to protect both the service and the director.

The chief improvements of the census of 1890 over that of 1880 were the addition of the item of miscellaneous expenses, previously strangely overlooked, the classification of wage returns, and the further differentiation of the great manufacturing industries by the use of special schedules. There is, however, a limit to the extent to which this specialization of industries can be carried, for the danger of overloading is always present.

The eleventh census was also a vast improvement over all its predecessors, in the system and intelligence with

which the schedules were classified, revised, tabulated and verified.

This brief reference to previous censuses of manufactures conveys some idea of the difficulties in the way of their collection and compilation, and of the reasons why comparisons between their several results must be made with many reservations, where it is permissible to make them at all. Inadequate provision and insufficient compensation for the collection of original data have been accompanied by other difficulties more serious—the reluctance of men to reveal the details of their private business into which they feel the government has no right to pry, the natural disposition to suppress or color the facts, and the fear on the part of many that data of this character are sought for some purpose that has to do with taxation. On top of all this is the difficulty of so framing a schedule that the manufacturer, however intelligent and well disposed, will make a return which will dovetail with itself. In gathering the statistics of the wool manufacture for the eleventh census, four out of every five schedules received had to be returned for important corrections; nor was this experience pecular to that industry. The carelessness of the enumerator, coupled with the carelessness or covert hostility of the manufacturer,—who is apt to regard these statistics with contempt where he does not look upon them with dread,—combine to make the returns less trustworthy, and more difficult to whip into shape, than those of any other branch of the census. These are difficulties that interfere with the collection of the data; those that inhere in their compilation are more serious still.

II. The Defective Standard of Measurement.

In an inquiry into the nature of these difficulties, we are confronted on the threshold with the impossibility of applying any uniform standard of measurement to the results of the enumeration. In treating of industry as a whole, the census is confined to value as the only available standard of measurement, quantities being out of the case. When we undertake to ascertain an average death rate, we have something definite and tangible to work for; something which means the same thing under all conditions, and the variations of which always tell their story in the same way. The standard of measurement by value is variable and untrustworthy in two ways. We have first the variation in the standard by which value itself is measured. Thus the census of 1860 was taken on the gold basis of value; the census of 1870 was taken when the paper dollar had an average value in gold of 79.81 cents; the census of 1880 was taken on the heels of the resumption of specie payments by the government; and the census of 1890 on a normal monetary basis. The standard by which we measure the volume of our manufacturing products has been essentially different at each of the last four censuses.

The census of 1890 has attempted to make the figures comparable, by reducing the value reported for 1870 to a gold basis,[1] thus reducing a product worth $4,232,325,442 to $3,385,860,354, notwithstanding General Walker's statement (already quoted) that to be a true photograph of the facts the value returned in 1870 should be increased by a sum exceeding $600,000,000, measured in the currency of the day. It is doubtful if the basis of comparison has been improved materially by this arbi-

[1] Eleventh Census, Manufacturing Industries, 1 : 2 and 4.

trary treatment of the figures; for it assumes that the inflated value of the dollar, in 1870, has only to be eliminated in order to make comparable statistics, whereas the fact is that another element of variation remains which forbids exact comparison—the variation in the quantity of product represented by a dollar, due to change in prices. This variation is so great as to make exact comparison impossible, even if the standard itself were fixed and uniform.

In his discussion of the manufacturing statistics of 1870 General Walker stated[1] that "after much thought and extensive inquiry on the subject, and the application of numerous tests, he was disposed to regard 56 per cent as a just statement of the increase in price for all classes of mechanical and manufacturing productions between 1860 and 1870; that is, that manufactured articles of the same quality (averaging all branches of production) which would have been worth $1,000,000,000 in 1860 would have been worth $1,560,000,000 in 1870. This would leave the increase of manufacturing production in the ten years to be represented by 52 per cent."

In other words, in the census of 1870, which showed an increase of 108 per cent over 1860, 52 per cent, according to General Walker's calculations, represented the increase in manufacturing production, or "the actual industrial growth," and 56 per cent represented the increase due to increased prices, caused partly by an inflated currency.

Thus we have General Walker, in order to get a reasonable basis of comparison for quantities with the census of 1860, suggesting the reduction of the value of the product of 1870 by 56 per cent of the value of the product of 1860 and Colonel Wright reduc-

[1] Ninth Census, Industry and Wealth, 379.

ing it by 20.19 per cent (the average premium on gold for the census year) for purposes of comparison with subsequent censuses. These two very different treatments of the same results, for the purpose of rectifying variations in the unit of measurement due to different causes, indicate how impossible it is for the lay reader of census figures to make a satisfactory use of them for comparative purposes.

Since 1870 the tendency of prices has been steadily downward, but no subsequent census has taken cognizance of this reversal of the conditions which General Walker attempted to measure in the census of the former year. The striking phenomenon of manufacturing has been the constantly increasing quantity of goods represented by a dollar, due to the cheapening of production brought about by improved machinery and processes, cheaper transportation, and the lower prices of materials.

Professor Falkner's report on prices, for the Aldrich Investigation of 1891, shows that, between 1860 and 1890, there was a greater decrease in the prices of manufactured articles than in any other group of necessities considered, the average fall in the price of clothing being nearly 25 per cent,[1] while in a great variety of staple manufactured articles it was very much more, as, for instance, print cloths, with a decrease of 42 per cent; nails, 41 per cent; hand saws, 62.5 per cent; scythes, 40 per cent; pocket knives, 47 per cent; and so on. It might be possible to establish a statistical barometer of values, for certain lines of staple manufactures, on the plan of Sauerbeck's index numbers, whereby it would

[1] Senate Report on Wholesale Prices, (1893), 1 : 83. See also the table of averages on page 91, where it is shown that the fall in the prices of groups of manufactured articles has been uniformly greater than in the food products of agriculture.

be possible to measure this difference with sufficient accuracy for practical purposes. No such collateral work could be attempted, except in connection with a permanent census office. Continuity of method in this respect as in a great many other directions, is impossible, where the whole organization of the census office is periodically broken up.

In the separate industries the difficulties growing out of the lack of a uniform standard of measurement are overcome, to a degree, by the existence of other standards, such as the unit of machinery capacity, as the spindle in cotton, the card in woolens, the loom in silks, etc. But even here the trouble is not overcome; for the spindle, the card, and the loom have been very different things, at each census, in the volume of production they stand for.

Nor are we much better off when, in the separate industries, we undertake to measure growth by actual quantities of given products. The difficulties of supplementing the money value of product by quantities, in special industries, are enormous, because of the constant variations which occur in the characteristics of these products. A yard of cloth is always a yard of cloth; but by no means is it always the same yard of cloth, or a yard that can safely be assumed to be the same, even for statistical purposes.

It is clear that an absolute unit of measurement, in manufacturing statistics, is impossible; and that the accepted unit, the dollar, represents at each census a different thing, both as to capital, product, and wages. There have been no two censuses at which the dollar represented the same quantity of goods, or, in the matter of wages, the same purchasing power. This fact emphasizes the warning of General Walker, that "the

conditions of the census material (in manufacturing statistics) do not allow of nice treatment, and it would be affectation to attempt fine distinction or precise computations in dealing with the subject." [1] That warning we are in constant danger of forgetting in our modern treatment of these statistics.

III. Factory Product and Trades Product.

A second difficulty is not less troublesome. What *is* manufacturing, and what are properly included in these statistics as manufacturing establishments? The same rule has applied in no two censuses; and the text of all of them is largely occupied in pointing out the things included in one and omitted in another. For instance, the censuses of 1850 and 1860 professed to contain a return of the "Product of Manufacturing, Mining, and the Mechanic Arts;" and they included the gold dug from the California mines. The census of 1870 included the value of stone, slate, and marble quarried, and also the value of the fisheries, excluded from subsequent censuses. The census of 1840 even included "houses" among the products of manufacturing industry; and it is by no means certain that they do not belong there. Mr. Steuart, chief of the division of Manufactures in the census of 1890, states that "certain industries, such as dressmaking, bottling, millinery, cars, and general shop construction, and repairs by steam railroads, manufacture of gas, etc., had apparently been included in the total of 1870, but in 1880 they had either been omitted, or the reports classified with other industries in such a manner that it was impossible to identify them." [2] They were all again included in 1890, with numerous

[1] Ninth Census, *Idem*, 375.

[2] American Journal of Sociology, 3 : 623 (1898).

other industries not previously enumerated in any census.

This constant variation in the rule of inclusion again illustrates the impossibility of satisfactory results, in the absence of a permanent census office controlled by some tradition which insures uniformity of method. It illustrates quite as forcibly the inherent difficulty of satisfactorily determining what is properly to be included in manufacture and properly returnable as such, under the indefinite language of the census law.

Since the founding of the government, the conditions of manufacture have been undergoing profound modification. It has passed rapidly from a household industry into a factory industry, and this latter has divided up into innumerable special industries. The first industrial census was almost wholly an account of household industries, or of semi-household industries,—such as the local carding and fulling mill which simply prepared the wool or finished the cloth spun and woven by the neighborhood families. Our word "manufacture," in scornful disregard of etymological nicety, has come to signify, in its popular use, something precisely the reverse of that which it chiefly signified when the first industrial census was taken. As we have progressed towards the factory, one after another of the old hand industries was eliminated from the manufacturing statistics, now because it had disappeared altogether, and now because it was carried on by single individuals. The arbitrary rule of requiring a product to be valued at $500 or more, to be included in the counts, was adopted in 1840. It is practically the only rule of discrimination to which the Census Office has strictly adhered. A more absurd rule could not have been devised.

The truth is that the manufacturing statistics, as now made up, are neither one thing nor another, neither flesh, fowl, nor good red herring. The time has come to draw a sharp line between the hand trades, properly so called, like brick-laying, house-painting, etc., and those productive industries whose products seek the general markets, and are subject to the general laws of trade.

It is impossible fully to cover the hand trades in an industrial census; the existence of the $500 rule is a confession of that fact. Moreover many handicraftsmen carry on business without any shop or paraphernalia which can be identified or enumerated as a manufacturing establishment. It would seem to be plain that industrialism pursued under such conditions ought not to be confused, for census purposes, with factory manufacture, and that the two classes of data cannot be mingled and combined, in the consolidation of manufacturing statistics, without affecting the exactness of the results.

There were returns from 355,415 establishments in the census of 1890. More than one-third of this number were establishments engaged in the occupations following:[1]

Bakeries	10,484
Bicycle repairing	83
Blacksmithing	28,000
Boots and shoes (custom and repairing)	20,803
Carpentering	16,917
Clothing (custom and repairing)	13,591
Dentistry	3,214
Dressmaking	19,587
Masonry	5,969
Millinery shops	6,000
Painting and paper hanging	10,043
Plastering and stucco work	1,746
Total	136,437

[1] Eleventh Census, Manufacturing Industries, 1; 36–45.

These establishments cover a form of industrialism which is not manufacturing, in the modern significance of the word. They are collected at an enormous expense, and their verification and tabulation enormously increase the cost and labor of the division of manufactures in the Census Office.

The conditions surrounding handicraft industry are so essentially different from those of the factory that the consolidation into one mass of the data relating to both must materially detract from the scientific accuracy of the results. Trades and manufactures are the same thing in census statistics; although political economy long since differentiated them as distinct and essentially different things.

The conditions of the so-called manufacturing establishments thus grouped indiscriminately together are so obviously different that any attempt to generalize from the data secured is dangerous and unsatisfactory.

Manufacturing must necessarily be treated as comprising the industries carried on under the factory system, which means something entirely different from household industry, from shopwork, from employment at a trade, even when the trade workmen are employed at wages by large contractors. These latter it is impossible ever to cover adequately in a manufacturing census and therefore it is useless to attempt to cover them at all.

On the other hand, by confining the census to what is distinctly recognized as factory production, we should have one complete and homogeneous thing, and could better conform its statistical presentation to scientific methods.

Some doubt exists as to just what factory manufacture is. It would be necessary to make an arbitrary defini-

tion; but no definition could be more arbitrary than the time-honored one which omits every industry whose product is under $500, and includes every industry whose product is $550. I suggest, as a rule which might be followed, a modification of that commonly found in the state labor laws, for the guidance of factory inspectors; *i. e.*, any establishment in which five or more persons are employed at wages, and in which power is used for the production of articles for sale.

General Walker in an article in 1869,[1] said that the contribution to the wealth of the country by its artisans, or hand-workers, is far more valuable than that made by its factory workers; and he added that the contribution to the national wealth made by these hand trades ought to be separately reported and carefully differentiated from the report of factory industry. He suggested the desirability of two distinct schedules — a suggestion which he did not attempt to carry out in either of the censuses whose taking he subsequently superintended. Those who had the practical administration of this bureau of the eleventh census inform me that his further suggestion, made in the Ninth Census, and quoted in the foot-note,[2] for a statistical estimate of the products

[1] *Atlantic Monthly*, 24 : 691.

[2] "Of the total amount paid for the collection of the Statistics of Manufacture in 'Schedule 4,' more than a fifth was expended for returns relating to carpentering, blacksmithing, coopering, painting, plastering, and plumbing, not one of which industries, though far better returned than ever before, was reported with sufficient completeness even to furnish the data for a computation of the true production of the trade, so that, after this expenditure, one is still obliged to resort to the Table of Occupations for the material from which to estimate the production of this group of industries. The money thus thrown away would have served, if placed under the control of the Department of the Interior for the salaries of experts and for traveling expenses of special agents, to make the statistics of the larger industries complete and correct in the highest attainable de-

of the trades, based upon the Tables of Occupations, is impracticable, for the reason that the larger portion, according to the returns, of those who describe themselves as "carpenters," "blacksmiths," etc., are actually employed in factories and mills, where their work is of the general nature described, while still others may not be employed at all at their chief occupation when the census is taken. It is unfortunately the fact that the statistics of manufactures, when studied in connection with the tables of occupations, present anomalies and inconsistencies which it is not easy to reconcile with our own conception of the facts. For instance, the manufacturing statistics of 1890 report 140,021 persons employed in carpenter shops, while the occupation tables show 611,482 carpenters in the country. In other words, only 23 per cent of the carpenters are returned as such in the

gree, creditable to the census as a national work, and invaluable to the statesman, the political economist, and the practical man of business. At the same time, a well-trained statistician can, in a few hours, from the Tables of Occupations, reach a far more satisfactory result in respect to the products of the minor trades than is to be obtained by manipulating the partial returns of the trades themselves. In a word, the returns of manufactures should be restricted to those industries which are carried on in considerable establishments, and are susceptible to a thorough, complete, and detailed enumeration.

Second. The returns of manufactures, having been thus restricted, should be far more specific, and should be made to conform to the advance in the practical arts within the last twenty years, and to the requirements of modern statistical science. The additional facts thus to be elicited should not be industrial merely, but such also as are of social and sanitary importance.

The manufacturing tables of the census ought to be so full of technical information as to become the handbook of manufacturers, while, at the same time, they might be made so pregnant with truths important to the economist and the statesman as to become a handbook of social and political philosophy. With no more authority of law than might have been contained in five lines of the statutes, and with not a dollar of expense above what has been incurred in making this unsatisfactory exhibit of the national industries, such an enumeration of the manufactures of the country might have been effected at the ninth census."—Ninth Census, Wealth and Industry, 384,f.

manufacturing statistics, the remainder not being returned at all, or being lost in the general statistics of car-shops, furniture factories, and other wood-working establishments. It is difficult to believe that 77 per cent of the carpenters of the country are employed in shops other than carpenter shops. It is difficult to believe that 74 per cent of the painters are employed in other than paint shops; and yet we are forced to this conclusion by the statistics as they appear, and there is no method by which the two groups of carpenters or painters can be segregrated and the statistics tested.

IV. Gross, "Net," and Actual Values.

A third difficulty encountered in manufacturing statistics has to do partly with methods and partly with phraseology.

As our censuses have hitherto been taken, they involve an enormous element of duplication and reduplication in the products, a defect which has been regarded as unavoidable, and which results, notwithstanding the constant warnings of the text, in an almost universal misconception of the real facts. The finished products of one branch of industry being constantly the raw materials of another in the ascending scale of modern industry, it follows that they are counted over and over again in swelling the final value of products. Thus in the wool manufacture, the product of the yarn mill is the raw material of the cloth mill, and the product of the cloth mill is the raw material of the clothing manufacturer; by the time the aggregate is made, the value of the yarn has been counted three times and the cloth twice. This is a fair sample of what goes on everywhere, from beginning to end of these industrial statis-

tics. A product the value of which has been stuffed and restuffed in this manner is a fictitious total; and all percentages reckoned thereon, in relation with any other items returned, are necessarily a snare and a delusion.

A curious illustration of the effect of this duplication, and of the difficulties it presents, is found in the case of gray cloths sent to finishing-mills to be bleached, dyed, or printed. Here the final processes are so slight, in comparison with the value of the material operated upon, that the censuses of 1860, 1880, and 1890 omitted the latter from the report of the value of product. In 1870, however, General Walker included this value, justifying himself by this reasoning:[1]

"Allowance must also be made for the different treatment of one other industry, viz., cloth-printing, in the present publication, from that adopted at the eighth census. At 1860 the value of the cloth printed would appear not to have been embraced, either in the value of materials or in the value of product; but in the former only the value of mill-supplies, coloring matter, etc., and in the latter the value added to the goods by printing. At the present census it has been thought best to include the value of the cloth in the statement both of materials and of product. By this means the net value created by the industry is as closely obtained as by the other method, while just so much additional information is given. Indeed, there seems to be no reason for making this one industry an exception to the entire list of kindred industries in this particular. The fact that the value of materials here becomes unusually great, as compared with the value to be added by the processes of printing, certainly constitutes no difference in principle as between this industry and any other. If

[1] *Idem*, 378.

the subject matter of the industrial process is to be included in the account when it amounts to three-fourths of the value of the ultimate product, there seems to be no good reason for excluding it because it reaches five-sixths of that value."

The reasoning is absolutely sound; but the result of its application in this particular case is so absurd that General Walker himself, in 1880, again excluded the value of the goods operated upon from the gross value of the product of the finishing-mills, as was done in 1890. But the duplication in this instance differs only in degree from that which prevails everywhere; and the case admirably illustrates the crudeness of the whole treatment of this problem of the manufacturing statistics.

The text of the Eleventh Census, recognizing the fact that the total value of products reported, $9,372,437,283, is a fictitious total, takes a step towards an approximation of the true total, by deducting from the above figure the whole sum, $5,162,044,076, reported as the sum expended for the raw materials employed in creating it, leaving a residuum of $4,210,393,207, which it describes as the "net value of product."[1] In this procedure, it follows the example set by General Walker in the ninth census and again in the tenth. It is an unscientific method of dealing with the difficulty, and unsatisfactory both in phraseology and in result.

The net value of anything is that value which remains after deducting whatever may properly be charged against it. In this case the census has deducted a great deal more than can properly be taken away, and instead of securing a "net" product, it has obtained a sum which is not the true value of our manufactured products, but simply *the value added to crude materials by*

[1] Eleventh Census, Manufacturing Industries, 1: 28,f.

the manufacturing process. The true "net value" of products is not the gross value, nor is it the added value obtained by deducting the cost of materials; but it is that added value, plus the sum originally paid for all the raw materials used, in the crude form in which they first appear in any factory.[1]

I conceive it possible so to take a manufacturing census that this difficulty of duplication will be eliminated, and a basis thus obtained for accurate percentages. It could be done by providing on the schedules two columns for the entry of the value of raw materials consumed: one column for all raw materials consumed in the absolutely crude form; the other for the raw materials purchased and consumed, which have been advanced by any process of manufacture sufficiently to insure their return in some other branch of industry. Raw wool or cotton would all be reported in column 1; yarns, dyestuffs, gray cloths for converting, etc., in column 2. The net product of industry, in any branch of manufacturing, would then be secured by subtracting from the gross value of products the total value of the materials reported in the second column. The result

[1] This method of the census leads to some curious conclusions. For instance, in Kansas the slaughtering and meat packing business constitutes 40 per cent of the gross value of the products of the state, (*Idem*, 416–421), and in this industry the cost of materials is very large, in comparison with the labor cost. The phrase adopted by the census reduces us to the absurdity of saying that the "net" value of the product of the meat-slaughtering business is the bare cost of killing and packing the cattle, *i. e.*, $8,560,000, whereas the materials upon which this sum was expended cost $38,031,824. In the manufacture of coffee, spices, etc. (*i. e.*, their roasting, grinding, and preparation for market), the cost of the materials as returned to the eleventh census, was $65,961,465, and the value of the product was $75,042,010, (*Idem*, 75), so that the "net value," as thus ascertained, was only $9,080,545. In the lard industry the "net" value of the product is reduced to $2,820,488, although the cost of materials was $12,654,360, (*Idem*, 79).

would be the apparent value, at the factories, of the products of the factories. There would be no duplications; and yet the value of all crude materials consumed would be represented in the resulting total, as it should be. We should then know the value of the factory manufactured products of the country, so far as it can be measured by means of a manufacturing schedule—something that we have never yet even approximately learned from the Federal census.[1]

V. Defective Analysis and Misleading Percentages.

We may fairly criticise the use made by the Census Office of statistics thus avowedly defective.

The text of the Eleventh Census contains an analysis showing the average value of product per employee in each of the industries, calculated both on the "gross" product and the "net" product, so called. For the former it is given as $2,204; for the latter as $999 per capita;[2] and both figures are wrong, and necessarily wrong, for the reasons just stated. The tables referred to[3] should never have been compiled or printed; for the elements entering into the average thus obtained are so variable, and the conditions governing industry in each of its branches are so wholly different, that they not only possess no statistical value, but invite misconception and false deduction. The only thing that can be

[1] The limitation upon this plan is its failure to account anywhere for the value of semi-manufactured raw materials, which may have been imported. The quantity of such is not large enough to vitiate the returns; it would always be an error on the safe side; and it might be closely estimated from the import returns made by the Treasury Bureau of Statistics.

[2] *Idem*, 37.

[3] *Idem*, 34–45.

said in their favor is that as computations they are mathematically correct.

Criticism equally harsh lies against other statistical presentations or mathematical manipulations of the manufacturing statistics of the eleventh census.

One table presents "average capital required and cost for a product valued at $100, by states and territories,"[1] and another similar table shows the same thing by specified industries.[2] These tables indicate that in the year 1890 the average cost of every $100 of manufactured product was $86.17. They are accompanied by a footnote explaining that the difference between cost and value ($13.83) does not show the true average profit or earnings of capital, because the cost reported does not make any allowance for "depreciation of plant or mercantile risks." It is therefore not the cost. So long as it does not show either the profit or the cost of manufacture, we must wonder why the table was made, since if it does not show one or both, or approximately show them, it shows nothing at all. In this particular instance, an additional vitiating feature of the figures is the duplication to which we have referred, of which the Census Office here has made no account, and which renders this entire series of calculations an instance of the official dissemination of false information.

All attempts to present, from census returns of manufactures, percentages of relationship between the several items reported (and they frequently appear in state censuses) are scientifically wrong, and a conspicuous illustration of the abuse to which official statistics are subjected. The percentages of "labor cost," the percentages of "labor's share in the manufactured

[1] *Idem*, 48.

[2] *Idem*, 49–53.

product," the percentages of "capital's profit," etc., which are frequently worked out from these statistics are not simply meaningless; they are, in the nature of things, deceptive and misleading.

In the first place, they are based upon averages, and these averages are in turn based upon conditions so absolutely dissimilar that their combination results in a statistical picture like that of the kaleidoscope. The colored glasses in the kaleidoscope always fall together in some symmetrical pattern; but it is always a pattern which has no relationship to anything whatever. The man who is working with silk as his raw material, worth a dollar a pound, will be shown to secure in wages a very small percentage of the total value of product. Another man who works in shoddy worth ten cents a pound will be shown to secure a very large percentage of that value. The wages of the two, let us say, are the same. What, then, does the percentage show? Why is it calculated? What statistical or sociological value has it? Shake the two together and strike an average percentage: the result is more worthless than before.

In the text of the ninth census General Walker presented an admirable demonstration of the futility of these vicious percentages.[1] He grouped the manufacturing, mechanical, and mining industries of the country into five groups, arranged in accordance with the manner in which the character of the subject-matter of labor affects the relations of wages to product. These five groups range from those in which the materials, so called, are intrinsically of no value until operated upon by labor, like the products of mining and other extractive industries, up to those in which, as in diamond-cut-

[1] Ninth Census, Wealth and Industry, 379,f.

ting, the value of the materials employed far exceeds the value of all other elements in the cost of production and thus carries the value of the product in these industries to a very high point, although comparatively little has been added to the original value.

Commenting on his table, General Walker says: "The first class of industries, with a reported gross product of $143,000,000, is shown to yield a net product only $5,000,000 less than that of the fifth class, which has a gross product of $841,000,000, while the wages paid in the first class exceed those paid in the fifth by 131 per cent. Nothing, perhaps, could set in a stronger light the necessity of considering all statements of manufacturing production *in connection with the value of materials consumed and the cost of labor.* Here are two groups of industries, the one reaching the gigantic total of $841,000,000, the other aggregating but one-sixth as much; yet the latter makes a clear addition to the wealth of the country equal to 96 per cent of the net production of the former, and actually pays more than twice as much in wages."

For the five groups his table, a part of which is here reproduced, shows the following curious and instructive results:

RELATION OF WAGES AND MATERIALS TO PRODUCT IN MANUFACTURING AND MECHANICAL INDUSTRIES.

CLASS.	Dollars of Wages in $100 of Product.	Dollars of Materials in $100 of Product.	Dollars of Wages and Materials in $100 of Product.	Product per capita, gross.	Product per capita, deducting Materials.
I	$51 30	$10 07	$61 37	$ 843 51	$ 758 54
II	23 07	43 86	66 93	1,400 00	785 87
III	31 20	34 28	65 48	1,376 84	904 92
IV	20 29	56 62	76 91	1,859 10	806 51
V	3 77	84 10	87 87	8,285 44	1,316 64
Aver'ge of all	$19 40	$57 19	$76 59	$1,967 80	$842 32

In reference to this part of the table he says: "It appears that the value of the materials consumed in the several groups of industries ranges from $10.07 to $84.10 in each $100 of product; that the amount of wages ranges (going, so to speak, in the opposite direction) from $51.30 to $3.77 in each $100 of product, while the gross product per capita ranges from $843.51 to $8,285.44, and the net product ranges from $758.54 to $1,316.64. The reason for these astonishing differences is not found chiefly in any difference in the quality of labor, or in the more extensive application of machinery in one class than in another, but almost wholly in the treatment of this subject of the materials consumed in the successive industries and classes of industries."

It is superfluous to add to such a statistical demonstration of the fact, that any calculation of relationship of wages to product, or employee to product, based upon a combination of the statistics of many industries so fundamentally different in the conditions surrounding them, will tell a story that is without statistical significance. The difficulty is inherent. Things which are different from each other cannot properly be combined for such purposes. Adding together all these figures returned from all these unrelated industries for the purpose of figuring percentages on the averages, is not essentially different from adding together bushels, pounds and yards, and striking an average of the whole. And yet it is done, and regularly done, in both national and state censuses.

VI. Capital in Manufacturing.

Other features of a manufacturing census are equally perplexing; most perplexing of all, perhaps, is the item of capital. The amount of capital invested in manu-

facturing has been called for in every Federal census of manufactures. The worthlessness of the return has been manifest in all of them, but Congress still insists that it shall form one of the elements of the return. J. D. B. DeBow, the superintendent of the seventh census, gravely reported that the returns of capital and product showed a return of 43 per cent upon the whole investment, and he added that "the ratio of profits in the several States is also given, presenting some anomalies which cannot at present be reconciled. Those who will examine the manufacturing returns of 1840 and 1820 will find still greater ones."[1] That was a naïve superintendent who consoled himself for the promulgation of a statistical absurdity by calling attention to the fact that his predecessors had perpetrated even greater monstrosities in the way of official figures! Examining Mr. DeBow's "anomalies," we find him showing, in Missouri, a profit of 89 per cent, in Kentucky of 62 per cent, in Texas of 83 per cent, in Illinois of 79 per cent, and in Utah a loss of 116 per cent! Those must indeed have been halcyon days for manufacturers—everywhere but in the land of Mormonism!

General Walker was the first to point out the uselessness of the attempt to return capital invested, and he did it with his customary fearlessness, both in 1870 and 1880. In the former census he said:[2]

> The census returns of capital invested in manufactures are entirely untrustworthy and delusive. The inquiry is one of which it is not too much to say that it ought never to be embraced in the schedules of the census; not merely for the reason that the results are, and must remain, wholly worthless, the inquiry occupying upon the schedules the place of some technical question which might be made to yield information of great value, but also because the inquiry in respect to capital creates more prejudice and arouses more opposition to the pro-

[1] Seventh Census, Compendium, 179.

[2] Ninth Census, Wealth and Industry, 381,f.

gress of the enumeration than all the other inquiries of the manufacturing schedule united. It is, in fact, the one question which manufacturers resent as needlessly obtrusive, while, at the same time, it is perhaps the one question in respect to their business which manufacturers, certainly the majority of them, could not answer to their own satisfaction, even if disposed. No man in business knows what he is worth, far less can say what portion of his estate is to be treated as capital. With respect, indeed, to corporations having a determinate capital stock, the difficulty of making a correct return in this particular becomes very much reduced; yet even here the difference caused by returning such capital stock at its nominal value on the one hand, or at its actual selling-price on the other, whether above or below par, might easily make a difference of 50 or 75 per cent in the aggregate amount of capital stated for any branch of industry.

Where, however, business is carried on outside of incorporated companies, the difficulty of obtaining even an approximate return of capital, resulting from the nature of the inquiry itself, irrespective of the reluctance of manufacturers, becomes such as to render success hopeless. So numerous are the constructions possible and even reasonable in respect to what constitutes manufacturing capital, that anything like harmony or consistency of treatment is not to be expected of a large body of officials pursuing their work independently of each other. The Superintendent is free to confess that he would be puzzled to furnish a definition (fit for practical use by enumerators) of manufacturing capital, or, even in a single case, with complete access to the books of a manufacturing establishment conducted by two or more partners, and with the frankest exhibit of the assets, both of the firm and of the individuals thereof, to make up a statement of the capital of the concern, in respect to which he would feel any assurance. When to such difficulties in the nature of the subject is added the reluctance of manufacturers to answer an inquiry of this character, it may fairly be assumed, in advance of any enumerations, that the results will be of the slightest possible value.

It is greatly to be regretted that the census should be encumbered by an inquiry yielding so little; yet provoking so much opposition to the progress of the general work.

The aggregate amount of capital invested in manufactures in the United States, as by the following tables, is $2,118,208,769. It is doubtful whether this sum represents one-fourth of the capital actually contributing to the annual gross product of $4,232,325,442.

It is a pity, and may almost be said to be a shame, that statistical information, in many respects of high authority and accuracy, should be discredited by association with statements so flagrantly false, even to the least critical eye; yet, as the manufacturing schedule annexed to the act of 1850 requires this return, and as there is a vague popular notion that the statement of capital in this connection is of real and great importance (instead of being, as it is, at the best, of the least

consequence), the Superintendent does not feel at liberty to withhold the results from publication; but he feels not only authorized, but required, by the facts of the case to brand them as he has here done, in order that no one may be deceived by the show of authority they present.

Returning to the question in 1880, after ten years of reflection and another attempt to accomplish the impossible, General Walker repeated these conclusions with equal emphasis and supported by additional arguments.[1]

Superintendent Porter, required by law to secure a return of capital in 1890, made an anxious effort to find a method that would avoid these scathing criticisms. He held consultations with business men, and the form of inquiry finally adopted was based upon their judgment, as supplying a drag net by which all forms of capital, directly or indirectly employed in manufactures, could be reached, although I believe it was their judgment that even in this form the return would be statistically worthless.

The Massachusetts state census has subsequently adopted a modification of the Federal schedule of 1890, and in order that the reader may have before him the whole present status of this capital question, I append the two schedules in the form of a footnote.[2] (See page 287.)

Here are discrepancies of a radical character, which prove that, with all the thought bestowed upon this question, there still exists among experts the gravest difference of opinion as to what constitutes capital actually invested in manufacturing.

Indeed, those who have attempted to meet General Walker's criticism, by formulating schedules to include credit capital with that actually and permanently invested in manufacturing, have had no clear conception

[1] Tenth Census, 2: xxxix.

of the intricacies of the problem. They have never attempted a restrictive definition of what constitutes capital for purposes of statistical measurement.

The Federal census schedule of 1890 is founded upon the theory that the gross assets of a manufacturing concern constitute its capital invested, and can properly be treated as such, in combination with the gross assets of all other manufacturing concerns. The gross assets of a business consist of everything it possesses available for the payment of its debts, and into them enters to a greater or less degree the credit of the establishment which has been used in accumulating these assets. The extent to which a manufacturer utilizes his credit varies from day to day and month to month, often by very

[2] QUESTIONS REGARDING CAPITAL IN MANUFACTURES.

U. S. ELEVENTH CENSUS.	MASS. CENSUS, 1895.	
CAPITAL INVESTED (BOTH OWNED AND BORROWED.)	CAPITAL INVESTED.	
Value of plant (the value should be estimated at what the works would cost in 1890, if then to be erected, with such allowance for depreciation as may be suitable in the individual case.)	CLASSIFICATION.	33. AMOUNT.
Land . . $	25. Land.	$
Buildings . . $	26. Buildings and Fixtures.	$
Machinery, tools, and implements . . $	27. Machinery and Motive Power.	$
Total .		
Live capital:		
Raw materials on hand . $	28. Implements and Tools.	$
Stock in process, and finished products on hand (estimate value of finished products on hand at their present selling value) . $	29. Cash.	$
	30. Credit Capital.	$
Cash on hand, bills receivable, unsettled ledger accounts, and sundries not included in any of foregoing items . $	31. Stock on hand (raw and in process of manufacture.)	$
Total .	32. Total Capital Invested.	$

large amounts. It is clear that his credit and his capital are two distinct things, fundamentally different in their relations to the conduct of his business, although they discharge the same functions. The borrowing capacity of a concern is not the sum which it actually borrows in its business, but the sum which it might borrow if business exigencies required. Credit is an intangible, elusive, elastic thing, indefinitely expansive, and subject to sudden contraction under financial panic. Capital is a tangible thing, which can be measured by fixed units. In combining the two under one head, the census has opened its returns to a criticism very different from that made by General Walker, but, from the point of view of scientific statistics, equally fatal.

The part which credit plays in carrying on the productive industries of the country is enormous and indispensable, but it is not a part that is susceptible of statistical measurement. A given sum of money often stands for transactions which aggregate three or four times its amount. These instruments of exchange rest primarily upon credit or confidence, and permit a volume of business enormously greater than would be possible if an actual dollar had to be exchanged for every transaction which represents a dollar.

The Federal census, by calling gross assets capital, harnesses up credit with capital, and thus commits itself to the statistical measurement of a thing which has no existence outside the confidence which business men have in each other. The pretended capital which has been created by these instruments of exchange has no existence whatever; at the end of the operation there is merely the original capital restored, increased according to circumstances by the profits which its use in operation may have produced and which have been divided

between debtor and creditor. Credit thus multiplies the producing and consuming power of society by facilitating exchange; it accelerates and thus increases this power, but it does not increase the actual capital of the country, or the actual capital employed in manufacturing.

Let us see how it operates in a concrete case. One mill reports, as its gross assets or capital, everything it has in the shape of plant, stock, product, cash, bills receivable, etc. Included in the latter will be the notes of another mill given in payment for $100,000 worth of print cloths. In the statement of the other mill will appear $100,000 worth of print cloths for which those notes have been given; the census gets $200,000, only half of which is actual capital, the other half being credit. Let us suppose that the second mill has an opportunity to sell these print cloths to a third mill at a profit, receiving in exchange therefor the latter's notes. The reports of the three mills will then show in the census a fictitious total of $300,000, plus two profits, which sum, when the transactions are finally completed, will resolve itself back into $100,000 plus the profits. The census return presumes that two distinct amounts of $100,000 each have been created, both of which disappear when the time of the maturity of the notes arrives. Inasmuch as the unsettled transactions between mills in related industries are at all times enormous, it is easy to conceive that the amount of duplication represented in the total capital reported must be frightful.

Independently of whether the resulting total is too large or too small to fit the inherent probabilities of the case, it is clear that the result is a purely arbitrary

figure, bearing no fixed relationship to any other return on the manufacturing schedule, and an attempt to measure in figures something which, so far as we can now see, is not susceptible of statistical measurement.

The Massachusetts state census of 1895 rejects the theory that gross assets constitute manufacturing capital, and attempts to limit its return to capital actually devoted to production. It includes, in capital invested, the value of raw materials on hand and of goods in process of manufacture; but it excludes three items covered by the Federal census of 1890; viz., (*a*) finished products on hand, (*b*) bills receivable, and (*c*) ledger accounts. It makes this explanation:[1]

> Undoubtedly these items should be included, if it is desired to know the *assets* of the establishments; but it seems equally clear that none of them should be included, if the aggregate is to show only *the capital devoted to production.* The item "goods on hand" is product, not capital. It is an asset, of course, but by so much as capital is increased by including it, the deductions which follow in the census report as to "Amount of capital required to a product value of $100," and especially deductions as to the relation of profit to capital, sure to be made, are invalidated.

This statement is astonishing for its tacit admission that deductions "sure to be made" from the census statistics, as to the relation of profit to capital, are permissible and possible. Inasmuch as no scheme is conceivable whereby it is possible to approximate a statement of the profits of manufacturing, since the element of sales, or prices obtained, is eliminated from the account,—the "value at the factory" being the only value ever taken, and since every census disclaims with all possible emphasis any attempt to measure profits, we are at a loss to understand why the Massachusetts census should hint at the possibility or propriety of such deductions under its scheme of reporting capital.

[1] Massachusetts Census of 1895, 5 : 222.

It is astonishing again in its suggestion that capital is not actually employed in manufacturing, unless its employment has to do directly with the productive processes. Whatever may be the amount of money locked up in goods on hand, that sum is just as much a part of the money required for and employed in carrying on the manufacturing business as though it were tied up in machinery and plant. Nor is it duplicated in any of the other items under which capital is reported.

As a result of these eliminations, we get in the Massachusetts census of 1895, a total investment stated at $516,082,557, required to produce a product valued at $849,807,302.[1] Comparing these returns with those of the Massachusetts census of 1885, in which the first attempt to include credit capital in a census was made, and with the Federal census of 1890, we have the following comparative results for that state:

	Capital.	Product.	Product per $1,000 of Capital.
Mass. Census, 1885[2]	$500,594,377	$674,634,269	$1,347.66
Federal Census, 1890[3]	630,032,341	888,160,403	1,409.70
Mass. Census, 1895	516,082,557	849,807,302	1,646.65

Thus we find that the three consecutive attempts which have been made to secure what is called a "complete" return of the capital invested in manufacturing in Massachusetts are so totally out of joint with each other as to discredit all of them. Without any means of ascertaining which is right, as establishing a true ratio between product and capital, the investigator must conclude that all are wrong and worthless. The one thing we do know about the matter is directly contrary to the inference of these figures; we know that the product per $1,000 of capital employed,

[1] *Idem*, 223 and 228.

[2] Mass. Census of 1885, 2: lxxxv and xciii.

[3] Eleventh Census, Manufacturing Industries, 1: 68.

when measured by value, instead of increasing as indicated by these figures, has shown a steady tendency to decrease. It would seem that this is a matter of such vital importance, in its relation to the economic situation of industry, as to forbid the government, whether national or state, to trifle with it in this manner.

The worthlessness of the eleventh census returns of capital is again demonstrated by the following table, showing the capital reported to each $100 of product in the several branches of textile industry.[1]

Woolen, including hosiery and knit goods	$ 87.7
Cotton	132.1
Silk	58.4
Dyeing and Finishing	133.1

That no such discrepancy as this exists, or can by any possibility exist, in the financial resources required to carry on these several industries, is patent.

But the difficulty is not alone with the live capital, so called, whether the same be owned or borrowed; it is equally difficult to deal properly with what is called *fixed capital*, or *plant*.

The census schedule of 1890 directed that "the value of the plant should be estimated at the probable cost of the works if erected in 1890, with such allowance for depreciation as may be suitable in each individual case."[2] Now, it is obvious that this is not a call for the capital invested in the plant, but for the *present market value* of the plant, as estimated by its owner, which is a very different thing, and a thing subject to so many varying conditions, dependent on so many contingencies, as to have no definite relation to the amount of capital actually invested. If we were reporting the capital invested in mortgages we would be seeking a definite sum—the

[1] *Idem*, 1 : 49,ff.
[2] *Idem*, 1 : 10.

actual amount advanced upon those mortgages at the time of record. But in seeking the amount invested in manufactures we are seeking, not the amount actually invested, for a large part of it—in fact, the larger part of it—has worn itself out in depreciation, in business failure, or in other ways. When the Census Office undertakes to make a statement in dollars and cents of the present face value of that capital, it attempts an impossible thing. General Walker's language is none too strong in denunciation of it. I am acquainted with dozens of mills where the actual investment of capital has been four or five times the present value placed upon the works by the managers or the assessors. I know a mill that cost $150,000 and was running until recently, which sold under mortgage foreclosure the other day for $15,000. There are at all times idle mills throughout the country, which are not taken at all by the census agents because they are idle. Yet they represent invested capital none the less. In 1890 I made a special inquiry regarding idle woolen mills, and found invested in their real estate and plant over $6,000,000, which is not included in the total capital reported for that industry.

A mill is worth, suppose we admit, what it will bring in the market, and therefore the census in calculating capital should take cognizance only of present market value. But the market value of mill property is contingent: contingent upon location, transport, and power facilities; upon the character and market for the goods it is making; upon the business conditions which prevail at one time and are absent at another; upon the efficiency of the management; upon the value of the patents owned and operated; upon a thousand and one things which cannot be estimated in dollars and cents.

So I say that the capital invested in manufacturing, either as live assets or in real property, is a thing which cannot be calculated in dollars and cents; in other words, a thing which cannot be statistically measured, and we may well question the propriety of the attempt to measure statistically a thing which eludes all standards of measurement.

The capital represented by buildings and machinery rented for manufacturing purposes is just as much devoted to those purposes as though it were directly invested, instead of being indirectly invested. We may conceive of two identical mills standing side by side devoted to the same product, each worth $100,000, one of them owned by the company operating it, the other leased—and perhaps leased from a principal stockholder. By the census method of treating the matter one establishment is represented as having a capital $100,000 greater than the other, to produce the same value of goods. In treating capital the eleventh census has excluded from its general tables the value of hired property, although the amount is given in the text, perhaps because it was necessary to estimate it on the basis of the amounts reported as paid for rent. Thus estimated, the value was $1,156,225,057, which, added to the "direct investment," so called, makes an aggregate of $7,681,381,543, of which hired property constitutes 15.05 per cent.[1] The Massachusetts Census and Annual Reports on Manufactures take no cognizance whatever of the capital invested in hired property. It is impossible to understand on what theory hired property can be excluded from consideration as capital invested in manufactures, when money temporarily borrowed is so included. Illustrations of this character suffice to

[1] *Ibid.*

show how impossible it is to draw conclusions of any value or any accuracy from these returns of capital.

There is nothing so patent as the fact that the capital that has been actually invested in manufacturing in this country is enormously greater than the aggregate reported by the census. Manufacturing capital has a tendency to eat itself up, to a degree unknown in any other branch of enterprise. A well-managed mill completely up to date will charge off 10 per cent per annum for depreciation and improvements made necessary by perfected processes in machinery. If we estimate the average annual loss at 5 per cent it is evident that manufacturing capital must entirely replace itself, either from its own earnings or from outside sources, every twenty years. No two manufacturers, taking cognizance of these conditions, will follow the same method in preparing their reply for a census schedule—not because of a desire to deceive or conceal, but because the whole thing is contingent, and contingencies cannot be statistically measured.

All this being true, what can be the propriety of continuing to gather this particular item in future census returns of manufactures? We have seen that it is an attempt to measure a thing which from its very nature cannot be statistically measured; a thing which can only be compared to the mercury in a thermometer, which expands or contracts according to the conditions of the temperature, and occupies more or less room with each variation. The return of capital for a particular month of the year can be no better test of the matter, in its relations to the whole question, than the register of the thermometer on a particular day is a test of the temperature of the year.

We have seen that all the schemes of the experts to

overcome these difficulties have been futile, and all future schemes must be equally futile, by reason of the inherent nature of the subject-matter.

We have seen that this is the one question which, more than all others combined, increases the difficulties of those who gather, and arouses the antagonism of those who supply, census data.

We have seen that the government, in promulgating these figures, puts the sanction of official authority upon a statistical falsehood.

We have seen that the return of capital is valueless for any statistical purpose, or as an aid in reading into the other figures their true meaning and significance. We have seen, finally, that more than any other figures in the whole group of census statistics, the return of capital is used to propagate false ideas of our social status, and to justify conclusions from industrial statistics which are delusive and harmful. Therefore I agree with General Walker that they might far better be omitted altogether from the census. Their presence taints and invalidates the whole body of manufacturing statistics.

The objections raised to the abandonment of the capital return are, first, that such an exhibit is necessary to a correct portrayal of the wealth of the country and its method of employment; and, second, that unless we have invested capital upon which to figure, the sociological utility of the manufacturing statistics is largely gone, and they cease to be of much practical utility in the elucidation of problems connected with the relations of labor and capital.

The answer to the first objection is that manufactures are the only branch of industry in which this attempt is made. In agriculture, mining, the fisheries, and mercantile occupations no kindred inquiry is made, although

it is quite as possible to secure satisfactory results in any one of these fields. A better way of stating it is to say that it is impossible to secure satisfactory results in either field. Those who demand impossible statistics in the census are like the child crying for the moon.

As to the second objection, it would seem to be obvious that it is better to avoid all statistics from which only false deductions are possible than to furnish a fictitious official foundation for building a sociological superstructure which is wrong. No computation or inference which one may base upon this return, considered in its relation to the other returns of the manufacturing census, has any value, because we can never know that it is even an approximation of the truth. It was a famous saying of General Walker's that one census error has a tendency to offset another, so that the aggregate results are sufficiently near the truth for statistical purposes. But from that statement the statistics of capital invested must always be excepted.

Beneath this second objection, whenever and wherever it is raised, there lurks another. Those who raise it desire the statistics of capital retained, because they believe these statistics furnish some basis whereby the profits of manufacturing can be measured, and we have quoted the statement of the director of the Massachusetts state census to the effect that these figures always will be used for that purpose.

Congress has no constitutional power to exact a census return which shall reveal individual profit or loss in private transactions, and for that reason it has never been attempted. Some of these later presentations of the capital question come dangerously near to attempting it by indirection. It is certain that they furnish a basis upon which amateur statisticians and sociologists think

they can figure a result sufficiently near the truth to warrant them in attempting all sorts of silly calculations concerning the relative shares of labor and capital in the proceeds of their joint endeavor. Every possible deduction of that nature which can be drawn from census statistics is false, and a breeder of mischief. For the government to perpetrate statistics which it knows to be false, and knows will be used for the promulgation of false theories and deductions, is, in the language of General Walker, a pity and a shame; we may almost go a step farther, and call it a crime.

VII. Classified Wage Returns.

Having spoken in so critical a spirit of many features of the eleventh census of manufactures, it is a pleasure to turn to another of which it is possible to speak with unreserved commendation. The presentation of wage statistics in the eleventh census is as nearly perfect a piece of statistical work, as it seems possible to render this very perplexing group of data, and far superior to any previous presentation in the census. The classified wage table, upon which its results were obtained and by which they were tabulated, is the outcome of the statistical experience and experiment of many years, many bureaus, and many countries.[1] It permits a photograph of the actual wage status in each of the industries, which presents a faithful picture, such as can be obtained under no system into which the average enters as an element. Since all rates of wages prevail, and prevail in all industries, an average of them all presents a statistical dictum which, for sociological purposes, possesses no more value than a calculation of the average age of the people of a state or a community.

[1] *Idem*, 1 : 13.

The wage mean of a nation, or of a particular industry, is of service, for comparison with the mean of another country or another industry, provided we can be sure that all the elements composing the comparison are the same. The average wage, including men, women and children, and including them in a varying ratio from census to census, is of very little value, as Colonel Wright has pointed out, "and is often vicious as used." Whether this vicious use made of it, in view of the extreme difficulty of correctly stating all the elements which must enter into a true comparison, is not a sufficient reason for excluding any such calculation from the census is at least an open question. It forms the subject of one of the severest criticisms passed upon the eleventh census of manufactures. That criticism rested upon the fact that the census schedule called for the average number of employees and the *total* amount paid in wages, and secured its average wage by dividing one into the other.[1] That the result was not a perfect average is apparent; for the sum of total wages paid was not paid to the average number employed, but to all who were employed throughout the year. How far the average secured is vitiated by lack of similitude in the parts, it is impossible to say. That the method adopted was the best that can be employed, I entirely agree with Mr. Steuart in asserting. But it remains a question whether the knowledge that the result is faulty in the first place, and of doubtful utility in the second, ought not to exclude such averages from the census altogether.

Mr. Steuart's careful paper does not meet this question. Neither does it satisfactorily explain the fact that

[1] W. M. Steuart, in *Am. Journal of Sociology*, 3 : 627.

by the census of 1890 the average per capita wage of all classes of employees was $484.49, while for the census of 1880, the same average, based upon returns presumably the same, was only $346.91. The one thing we do know, without the aid of "official statistics," is that no such increase in average earnings actually occurred between the decades. Hence we know that notwithstanding the popular belief that official figures do not lie, one or both of these averages is wrong. All the circumstances connected with the enumeration and tabulation justify the belief that the error occurred in the tenth census. That it was a clerical error, hidden away somewhere in the multitudinous tabulations, is probable. However it occurred, it is only another illustration of the extreme fallibility of census statistics, and the great danger of predicating convictions upon the outcome of this vast mass of data, brought together from thousands of different sources, by thousands of human agencies, each with his own point of view, and tabulated by a body of clerks to whom the figures mean nothing.

No two manufacturing censuses heretofore taken have been comparable, in the strict sense, and it will be a long time yet before we reach the point when that will be possible. But we need not despair of them on that account. The conditions governing manufacturing industry change so rapidly that they preclude accurate comparison. The changes in classification alone, which are necessitated by the steadily increasing diversification and specialization of industry, throw comparison out of gear everywhere. The constant improvement in census office methods operates in the same way. In view of the fact that no two past censuses are properly comparable, I do not think that any census administration should hesitate to adopt any change of method which involves

obvious improvement in results, simply for the purpose of retaining some semblance of uniformity. Actual uniformity being impossible, every improvement should be made when it can be, with a view to bringing the method to a point approximating perfection as quickly as possible. However, it should again be added that we must despair of that until such time as Congress can be persuaded to establish a permanent Census Office. It is hopeless to expect a satisfactory census, in any branch of the work, so long as the office is broken up and reorganized with each decennial census. A temporary office has no traditions. No appropriation, however lavish, can buy experience in census matters. That which is learned in taking one census is worth a million dollars as a nest-egg for the improvement of the next, and another million as a direct saving in the total cost—a mild estimate of the expense of relearning it. The refusal to make this office permanent is the most striking illustration of the habit Congress has of saving at the spigot and wasting at the bung-hole. Until the knowledge of the errors and mistakes of one census is brought directly to bear, through continuity of service, to guide the taking of the next, we shall continue to have faults in this work, for which no director can be held responsible.

In the meanwhile, this review has shown that no census of manufactures, prior to that of 1880, when the work of enumeration was first taken from the hands of the deputy marshals and turned over to a body of men which, however deficient, was at least homogeneous and amenable to the regulation and discipline of the director, was in any sense an adequate or trustworthy presentation of the industries of the country. The manufacturing census of 1880 was as far superior to the best of its predecessors as language can describe; and that of

1890 was a vast improvement over the tenth. With these consecutive examples of progress before us, we have no need to despair of the ultimate attainment of a manufacturing census free from all genetic criticism.

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The Report of the Eleventh Census on Manufactures.

Primarily the object of a Federal census was to obtain a count of the people for the purpose of determining the congressional representation. The census reports of to-day are supposed to contain, not only the number of the inhabitants with numerous details concerning nativity, age, sex, and physical and social condition, but a complete statistical presentation of the resources of the country, statistics of the transportation business, wealth, insurance, and reports on numerous subjects considered by Congress or the Executive as worthy of special investigation.

While the practice of encumbering the census with a number of independent inquiries has resulted in securing and codifying a vast amount of valuable information, it is not systematic, and has in a measure diverted the energy of the office from the primary objects of the investigation, viz., the presentation of uniform and reliable statistics that can be used in making those contrasts and comparisons that are most instructive and useful for deducing sound rules for the administration of government and for the promotion of the welfare of society.

The consensus of opinion appears to be that the census of 1900 should be limited to the three topics, population, agriculture, and manufactures, and the information concerning each confined as far as possible to general totals.

The Report on Manufacturing Industries in the United States at the eleventh census is composed of three parts or volumes. Part I presents totals for the United States, states and territories, counties and indus-

tries; Part II, statistics for the 165 cities that had a population of 20,000 and over; and Part III, detail statistics and text for a number of important industries. There are more than 2,000 royal octavo pages of solid statistical tables in these volumes, but they do not contain much more than half of the detail that would have been presented had the original scheme been followed.

In collecting the statistics of manufactures there were 27 special schedules provided for as many important industries, and one general schedule to be used in reporting all industries for which special schedules were not furnished. The questions in all of the schedules were uniform in so far as they called for the amount of capital invested, number of employees and yearly wages, cost of materials, miscellaneous expenses, and value of yearly product. But the special schedules had numerous questions designed to develop detail statistics concerning the industries to be reported on them. Many of them were subdivided; for instance, the schedule on which the iron and steel industry was reported had separate sub-schedules for each of the following branches of the industry: blast furnaces, rolling mills, Bessemer, open-hearth, Clapp-Griffiths and Robert-Bessemer steel works; crucible, blister, German, and miscellaneous steel works, and bloomeries and forges, making six schedules for the industry. In the same manner the electrical industries were reported on about 30 separate schedules, each one having questions peculiar to a particular branch of the industry.

The schedules were prepared with the intention of gathering data that would permit an exhaustive statistical presentation of the manufacturing and mechanical industries of the country. If the scheme had been followed to its logical conclusion, the results would have

formed an ideal census, but they would not have been published before the time to begin work on the twelfth census, and their magnitude would have detracted from their value. But the theoretical results indicated by the form of the schedule could not be reached, for the obvious reason that it is impossible to obtain a report on such a schedule, perfect in every detail, from each and every establishment engaged in the manufacturing and mechanical industries in the United States; it is impracticable to secure such a report for even the larger establishments, say those with an annual product of $10,000. The manufacturers are not inclined to furnish such details concerning their business, and the majority of them do not keep book accounts from which the information could be obtained.

The schedules were probably theoretically perfect, or very nearly so, but the detail considered essential to such perfection rendered them in many respects undesirable for a canvass to be conducted by inexperienced enumerators. The schedules for such a canvass should be designed, not with the idea of developing detail, but with the view of curtailing the number of inquiries as far as possible, consistent with a full report of the total values that it is desired to present. The schedules of the eleventh census probably secured a fuller report than did those of any prior census for each of the four totals of capital, employees and wages, materials, and products, because it required the items forming each to be reported separately.

It is evident that the schedules of 1880 were not sufficient in detail while those for 1890 erred to some extent in the opposite direction. The schedules for the twelfth census should be prepared with a full knowledge of the

results obtained by the use of the schedules at the two preceding censuses, as well as the difficulties of the canvass in which schedules with numerous questions are used.

Having in view the fact that the establishments engaged in the productive industries are largely concentrated in cities, General Walker, superintendent of the tenth census, caused the canvass in 100 of the principal cities to be made by agents appointed especially for that purpose.[1] At the eleventh census 1,049 cities were treated in this manner. The agents appointed to collect the statistics of manufactures were paid by the day, not by the schedule as were the enumerators. The results at both censuses show that a more thorough canvass was made of the cities than of the rural districts, and as there were a greater number of cities canvassed in this manner in 1890 than in 1880 the grand totals of the later census indicate that a more thorough canvass had apparently been made of the entire country.

Of the 1,049 cities canvassed by special agents in 1890 the totals for only 165 were published separately.[2] The totals for these 165 cities show that they contained 52 per cent of the establishments of the country and 67 per cent of the total product. It therefore is evident that if a careful canvass had been made of 1,050 of the principal centers of industry, reports would have been secured from practically all of the manufacturing establishments of the country. This was the intention of the eleventh census, but, owing principally to the lack of time for preparation, the canvass in many of the cities was not thorough.

In no other branch of the census canvass was the lack

[1] Tenth Census. Manufactures. 379–445.

[2] Eleventh Census. Manufacturing Industries. Vol. 2.

of experienced employees and of a thorough organization more keenly felt than in the canvass of the cities for the statistics of manufactures. The necessity of a thorough and rapid canvass is just as urgent as it is in the enumeration of the population, but the work in the 1,049 cities was not thorough, and in fact the canvass in the 165 cities for which the results were published separately, was not finished until 1893, three years after all the data for the census were supposed to have been gathered, and it was only accomplished then by sending clerks and agents from the office in Washington to finish the field work.

The canvass of the cities by special agents is the only satisfactory method of collecting the statistics of manufactures. It was inaugurated at the tenth census, and while the system was not then perfected, it was adopted, practically with no changes, at the census of 1890. The only objection to such a canvass is the increased expense. The reports secured by special agents at the eleventh census cost on the average, one dollar apiece, and as a large percentage of them were for very small establishments, such as dressmakers, boot and shoe shops, blacksmith shops, etc., the results were criticised as not justifying the increased cost.[1] But it is only by perfecting this branch of the canvass that the early publication of reliable data can be assured.

The preparation of the schedules; listing the names and localities of the principal establishments, to be used as a check on the reports, appointment of enumerators and special agents, and following the canvass to insure a thorough enumeration, are all preliminary stages in census work. They are, however, the stages on which the whole superstructure is based, and if the plans for

[1] *E. g.*, above, p. 271,f.

this branch of the work are not carefully matured, and the work itself pushed systematically and vigorously the census will be a failure.

The census totals for population, agriculture, and manufactures can only be accepted as the results of a popular canvass, which of necessity is more or less incomplete. The results are not exact, and probably never will be, but they come nearer and nearer to exactness as the methods under which they are reached approach perfection. The Census Office is not a permanent bureau and only two enumerations, those of 1860 and 1880, have been made under the supervision of a person who had supervised a prior census. At each census the foundation has to be laid anew and practically the whole work accomplished by inexperienced persons; nevertheless an examination of the reports will satisfy the most skeptical that there has been a constant improvement in every direction.

It has been the endeavor of the superintendent of each census since 1850 to make a complete enumeration of all establishments engaged in the productive industries. These enumerations have included both large and small establishments, as well as those conducting a mercantile business in connection with manufacturing, and some that possibly should not be classed as manufacturing.[1] The theory seems to have been to include all industries that could in any sense be considered as productive, excepting, of course, agriculture and mining. Carpentering, masonry, and all the building trades have been included, the value of the buildings erected or the work done on them being accepted as the product for the year. Millinery was reported, and the value of the trimmed hats and similar work given as the product,

[1] *Cf.* above, pp. 269–275.

also dressmaking, mechanical dentistry,[1] and numerous industries carried on almost entirely in very small shops, provided the annual product amounted to five hundred dollars. The statistics, therefore, do not pertain exclusively to industries conducted in factories and now commonly accepted as the manufacturing industries of a country, nor can the results be accepted as showing the exact increase or decrease in many of the industries enumerated; for instance, there were 9,184 carpenter shops reported in 1880 and 16,917 in 1890, or an increase of 7,733, but all the carpenter shops were not enumerated in 1880, and while a greater proportion of them were reported in 1890, it is known that they were not all returned. The totals for a number of other industries, such as "Boots and shoes, custom work and repairing," "Blacksmithing and wheelwrighting," and "Clothing, women's, dressmaking," are open to the same criticism. These industries are referred to in the census reports as "hand trades," and the number of establishments reported for them can only be accepted as forming a part of the grand total for all industries, which they increase when the canvass is thorough, whereas they have a tendency in the opposite direction when the canvass is lax. The totals for the separate industries do not show the actual increase or decrease from decade to decade, because no census has succeeded in securing a report from all of the establishments. Therefore the results are frequently referred to as of no practical use and misleading. All of the census totals are open to similar criticism; the totals for population, and for the different occupations as obtained from the population schedule are not true. Numerous omissions have always occurred in the enumeration, but the tendency has been to decrease them,

[1] Mechanical dentistry was reported but in part. Cf. Eleventh Census. Manufacturing Industries, 2 : IX, X.

and it is only by persistent effort that perfection can be attained. There is no method of determining the extent of the omissions in the report on manufactures, except by a re-canvass, as no comparisons can be made between the statistics of population and manufactures for this purpose.

It is essential that all industries should be included in a census that purports to show the productive forces of the country. Reports should be secured from all establishments, large and small, otherwise the results will not be a true indication of our manufactures. It is useless to assert that the results do not warrant the additional expense and difficulties attending the enumeration of the small establishments, and that the statistics could be estimated. It is impossible to prepare an estimate for an unknown proportion of an unknown quantity, and all attempts at such an estimate will be far more unsatisfactory and misleading than the results of a canvass, even though we know that, because of the magnitude of the work, omissions have occurred. But the factory system has now so thoroughly permeated all lines of industry that it is essential some distinction should be made in gathering and presenting the statistics for the great and truly manufacturing industries. This was attempted in a limited way at both the tenth and eleventh censuses, but the magnitude of the work and the limited time for preparation made it impossible to perfect the scheme, except for a few of the most important industries. The results of this effort at the eleventh census are contained in Part III of the Report on Manufacturing Industries. This volume presents statistical details and explanatory text for 18 of the principal industries of the country. The intention was to present historical and statistical reports similar to

those on the Factory System of the United States,[1] Petroleum and its Products,[2] The Building Stones,[3] etc., published in the tenth census. This was found to be impracticable, however, and the presentation was curtailed so as to present the statistics and text for all of the industries in one volume of 725 royal octavo pages.

The objections to gathering and publishing detailed statistics of this character in connection with a general report on manufactures are twofold. First, it tends to multiply the number of different schedules and inquiries, making them so complicated that the enumerators cannot comprehend them, and the manufacturers hesitate to furnish the details. Second, the statistics for many of the industries have to be confined to a certain class of establishments rather than to the character of products, and the quantity and value of products are confusing and misleading when compared with a general table giving the total for all industries. For instance, $430,954,348 is shown in the general tables on manufactures as the value of product for iron and steel, while the special report on the same industry shows $478,687,519 as the value of product. The difference of $47,733,171 is accounted for by the fact that some of the establishments included in the special report manufacture finished articles that in the general tables were assigned to other branches of industry, such as iron and steel nails, iron pipe, iron doors and shutters, etc. The special report is confined to a presentation of the statistics of blast furnaces, rolling mills and steel works, iron ore forges, and pig and scrap iron bloomeries; but a large number of the establishments, that in 1880 were assigned to some one of these groups, now take the

[1] Tenth Census. Manufactures, 527–610.
[2] Tenth Census. 10.
[3] *Idem*, 10.

crude material and produce finished articles, such as steel rails, boiler plate, nails, etc., so that the products of the different establishments have no more relation to each other than have the products of a nail factory and a foundry and machine shop. The industry has undergone such changes that there is now no cessation in the different stages of production, they are all carried on continuously under the same roof and it is no longer possible to classify the establishments according to the character of the material consumed.

In the special report on chemicals and allied products[1] it is admitted that the statistics do not cover all branches of the industry, but are confined to certain selected products, and the schedules from which the totals were compiled had to be segregated and assigned to numerous branches of industry in compiling the general tables on manufactures. The text states, "Castor oil, glucose, soap, and allied products included in the chemical report of the tenth census, were not so enumerated in the eleventh. Pharmaceutical preparations, ready mixed paints, varnishes, and japans, reported among the general statistics of manufactures in 1880, are included in the totals presented in this report. Baking powder, blacking, cottonseed oil, glue, inks, linseed oil, patent medicines or proprietary goods, vinegar, whiting, and paris white appear in the general statistics of manufactures for both censuses."[2] In other words, the report does not present statistics for the industries it is supposed to cover.

It is evident that with but few exceptions the special reports contained in Part III are not exhaustive, and that in the present state of industry complete reports of

[1] Eleventh Census. Manufacturing Industries, 3 : 273–308.
[2] *Idem*, 275.

this character can only be prepared either by a system that follows a given material to a finished product, regardless of the character of that product, or by a system that considers a given kind of product regardless of the character of the materials entering into it or of the establishments producing it. But as such methods are not in harmony with a general census of all industries, the two reports should not be blended. The special reports have their value, but the methods of gathering and compiling the statistics should be peculiar to the industry treated, and should not be abridged so as to conform to general rules made to apply to all industries. The data should be gathered quite independently of the general enumeration, and the statistics published in distinct reports.

The character of the information required for a census report on manufactures, the methods of gathering the data, and all the factors entering into their compilation render them unreliable for the purpose of computing the various elements of cost entering into a given unit of product, or the proportion of total cost that should be charged to capital and labor respectively. It is frequently asserted that the Report on Manufacturing Industries of the eleventh census contains tables purporting to show such facts. The tables[1] referred to show the amount expended for miscellaneous expenses, wages, and materials, respectively, in a product valued at $100. The general summing up for all industries shows the total cost of $100 worth of product to have been $86.17, of which miscellaneous expenses formed $6.73, wages $24.36, and materials $55.08, and it is explained that the remaining $13.83 cannot be accepted as the profits or earnings for capital, because the cost re-

[1] Eleventh Census. Manufacturing Industries, 48–53.

ported on the census schedule does not include cost for depreciation of plant or mercantile risks.[1] But these tables do not, and from the very nature of the data on which they are based can not, show the proportion credited to labor of the total cost of manufacturing a given quantity of finished product. The census schedule did not solicit data on which computations as to the total labor cost in the finished product can be based; it only contemplated a statement from each manufacturer of the amount he expended during the year for each of the three items of cost enumerated above. For instance, a pig-iron manufacturer reports that he expended $500 for miscellaneous expenses, $3,500 for wages, and $4,000 for materials. If similar statements are obtained for all the blast furnaces, rolling mills, steel works, and other iron and steel manufacturers in the country, the totals will show the expenses under each of the three items in the iron and steel industry of the country, and the proportion that each bears to the gross value of product is presented in the tables referred to. Such totals do not show the proportion of the total value of finished product that should be credited to labor. They only show that for each $100 received by the manufacturers a certain amount was paid for each of the items of expense enumerated.

The value of the finished product of the blast furnace is due to the manufacturing forces expended on it, of which labor is the principal element, but it enters the steel works, so far as the census reports are concerned, as pure raw material and its cost is reported by the steel manufacturer as the cost of his materials. In his report he has nothing whatever to do with the elements that go to make the value of those materials. But it is

[1] *Idem*, 48, foot-note. Cf. above, p. 280.

evident that in order to ascertain the labor cost in any finished article the amount expended for labor in each and every stage of production must be considered, and the duplications incident to the products of one factory entering as materials in another eliminated. Of these duplications and re-duplications the census reports take no cognizance, the materials entering each manfucturing establishment are considered as being in their pure raw conditiou and no attempt whatever is made to analyze their value. In other words, each establishment is supposed to commence and end business with the beginning and ending of the census year; no account is taken of their operations before or after that date and no attempt is made to analyze the values reported. Therefore the census totals can only be accepted as showing, and in fact they only purport to show, the amounts expended by all manufacturers for miscellaneous expenses, wages and material, and the amount they receive for their product.

The duplications entering into the finished product and the proportions that the contituent elements of that product bear to each other and to the total true value, can only be ascertained by a careful detail investigation. While such facts may in the future be disclosed by census investigation, it has not thus far been the design of the census inquiries to develop them. The census totals as presented in all of the reports, and the official computations based on them can only be accepted as disclosing the simple facts of expenses and receipts. It was supposed that each manufacturer could give reasonably accurate data as to the amount he expended during the year for miscellaneous expenses, wages, and materials, and the amount of his receipts; this was all the office deemed it wise to call for, and in fact it was very difficult

in many cases to obtain even such simple data. But having such figures, it is obvious that but one calculation could be based on them, and that would be to determine the amount of each item of expense represented in a given value received. This calculation has no connection whatever with the proportion that labor cost is of the total cost of a finished product; such a calculation must have an entirely different basis; it is intricate, and of necessity an extended computation. It was attempted in the report of the United States Department of Labor on the Cost of Production, and was found to be possible only in a few industries where the different stages of production were well marked. Notwithstanding these radical differences, the census totals are constantly quoted as showing that the laborer receives only 24 per cent of the value of the product of his industry. Nothing is more absurd, and the figures are not capable of such construction except by the most woeful distortion.

The total value of the products of manufacturers for 1890 is reported as $9,372,437,283. This total has been criticised as misleading, in that it contains so many duplications. It is true that if the processes of production are followed step by step and the cost of the original raw material increased only by the value due to the manufacturing forces expended at each stage, an entirely different total will be obtained, but that total will not be the value received by the manufacturers for their yearly products. The manufacturers are not in a position to report any other value for their products than their receipts during the year, and under the theory in conformity to which censuses have heretofore been taken, it would be impossible for the census office to publish any other total as the value of the products

of industry. The total can be reduced by subtracting the cost of materials, which amounts to $5,162,044,076, and while the difference, $4,210,393,207, may come nearer to the value added to the raw material by the manufacturing processes through which it has passed, it is not the true enhanced value of those materials, and certainly is not the value which is received by the manufacturers and out of which the business expenses and profits of the year are paid.

The duplications incident to manufacturing when carried on by different establishments is referred to in the text of the census reports and $4,210,393,207 given as the net value, or gross value of products less the total cost of materials used, but no claim is made that the amount represents the exact value added to the raw materials by the manufacturing processes; it is rather referred to as indicating the method to be followed in ascertaining such a value. The census inquiry as to "product" was designed to obtain only the full value of the year's production. No attempt was made to ascertain what became of the products, whether they were purchased by the final consumer, entered another factory as materials, or were destroyed by the purchaser. The product of one establishment may have been cloth and of another ready made clothing. The latter may have purchased the wool and raw cotton and manufactured the cloth out of which he made his finished product, clothing, or he may have purchased the cloth from the former, but with the character of the materials or product the census had no concern. The amount expended for materials, no matter of what they consisted, and the amounts received for the year's products were the only amounts to be reported. The sum of the amounts received by the cloth manufacturer for his

cloth and of the amounts received by the clothing manufacturer for his clothing, represents the value of the products of the two establishments.

It is possible that in the future some other scheme may be devised for collecting and compiling the census statistics of manufactures, but until its practicability has been fully demonstrated, it seems to me that the results of the year's business as shown by the books of each manufacturing establishment should be reported, and the total of all published as the result of the various operations. After eliminating, as far as possible, the incomparable features of the censuses of 1880 and 1890 the increase in the value of product is computed at 69.31 per cent. This is an increase in gross values, and is no indication of the increase in the actual productive forces of the country, which is determined only by the increase in the quantity of product. A given value now represents a much larger quantity than formerly, and therefore the percentage of increase in quantity would be much larger than it is in the values. This excess of increase in quantity is indicated in the census reports for a few industries, of which the factory product of boots and shoes is one. There were 125,478,511 pairs of boots and shoes of all kinds reported for 1880 and 179,409,388 pairs in 1890, an increase of 42.98 per cent as compared with an increase of 32.88 per cent in the value of products. But it is impossible to ascertain the quantity of products for all industries, not only because of the great diversity in their character, ranging from the rough log in the forest or the bar of pig iron in the blast furnace to illuminating gas and electricity, but because, with the exception of a few industries, it is impossible to keep a record of quantities, and the information is not in existence. The office therefore has been

forced to accept values as the standard of measurement, and while they are a reliable indication of business prosperity or depression, they do not show the increase or decrease in manufactures with the exactness that it is desirable.

Accepting value as a reliable unit of measurement, the use of the gross value of all products for this purpose is not beyond criticism. The true value that should be used is the value of the materials in the shape that they first enter a factory plus the cost of all the productive forces expended on them in the different stages of perfection through which they pass in reaching the finished product, but this value is one that but few manufacturers are in a position to furnish. The gross value when compared with a similar value may be accepted as indicating the conditions prevailing at the two periods compared. But unfortunately there are other factors that tend to confusion in the use of these values; for instance, there is an increase of 86 per cent shown for slaughtering and meat-packing, indicating that the value of these products had increased in that ratio, while as a matter of fact a large proportion of the increase is accounted for by the concentration of the industry. The retail butchers, who were not reported at either census, have given place to the large establishments, or are obtaining their products from such establishments and appear in the roll of merchants only, and as similar conditions exist in other industries, the total value of products can be accepted as an indication of the increase, only in certain lines of industry.

The inquiries concerning employees and wages used at the eleventh census were far more complete than those of any previous census, and yet the results have been the subject of more adverse criticism than possibly

any other feature of the census reports. It is impossible to secure a complete report of employees and wages unless the general classes are designated. This was realized when the schedules for the census were prepared, and the classification adopted was: 1st, officers and firm members; 2nd, clerks; 3d, operatives, skilled and unskilled; and, 4th, pieceworkers. The published reports show not only the average yearly, but the average weekly earnings for the classes of employees designated and the average number employed during the year at stated weekly rates of pay. The objections to the inquiries are threefold:

First The sum of the employees and wages given in answer to the four sub-questions of the inquiry are not proper totals to be placed in comparison with the totals for prior censuses. The questions used at prior censuses designated no class of employees, and it is evident that officers, firm members, and clerks, and their salaries, were not fully reported, and therefore they should be omitted when computing the average wages that are to be compared with a similar average for 1880. The average as then computed is $445 as compared with $347 for 1880. It is probable that the average for 1890 is about correct, and the large increase over 1880 is accounted for as follows: The form of the question for 1880 tended to obtain a number in excess of the average, which of course would reduce the average wages, but in addition to this, an examination of the original reports and tabulations of that census discloses the fact that the reports were not edited in the careful and thorough manner that they were in 1890; that is, some reports in which employees were given and no wages, or a trivial amount of wages, or, apparently, an abnormal number of employees as compared with the wages, were allowed

to stand and enter the tabulation in their defective condition. While the number of such cases was not ascertained, and could not be ascertained without a re-examination and tabulation of the reports, the practice tended to increase the number of employees and to decrease the average wages obtained when using the total as a divisor. The form of the question and also the defective condition of the reports resulted in obtaining a lower general average wage than the actual conditions warranted. Therefore the defect, so far as the comparison is concerned, is to be found in the reports for 1880 rather than in those for 1890. But the defect was evidently not very serious, for the census of the State of Massachusetts shows an increase in the average annual earnings during the decade from 1885 to 1895 of $95, while the census reports show an increase of $98 for the decade from 1880 to 1890.

Second. The inquiry calls only for the average number of persons employed during the year. While the average has been generally accepted as the divisor for the total wages in ascertaining the average earnings per employee, it is not the true number that should be used for that purpose. The average is a number that, for large establishments especially, can be ascertained only by calculations which the enumerators and special agents, as a rule, are not competent to make, or do not care to take the trouble to make. The result is that the true average number is rarely reported, and the divisor is either greater or smaller than it should be in order to ascertain the average earnings.

Third. That portion of the inquiry calling for the number of persons employed at fixed rates of wages per week did not require the different classes to be reported

separately, and the result is that firm members, officers, clerks, laborers, and skilled and unskilled operatives are included in one general total. The results therefore do not show the number of wage earners employed at stated rates, but the total number of all classes, and are apt to be misleading.

Notwithstanding these objections, the inquiries concerning employees and wages were a great advance over those of prior censuses. The inquiries under this head prior to 1890 were so general that no check could be made on the answers in editing the schedules, and the results are certainly not of the character that should be compared with those of the eleventh census for the purpose of computing the exact increase.

I believe the reports of the eleventh census contain about as complete a presentation of employees and wages as it is possible to secure by means of a general canvass. The statistics form a reliable basis for comparison with the results of future censuses, provided the same form of inquiry is used. The only change that I can now suggest would be to separate the officers, firm members, and clerks from the other employees in reporting the number at stated weekly rates of pay.

The census inquiries concerning capital were formulated with the intention of securing the value of all the property or assets used in the business strictly pertaining to manufacturing, whether such property was owned, borrowed, or hired. The several items were specified as land, buildings, machinery, tools and implements, raw materials on hand, stock in process and finished products on hand, cash on hand, bills receivable, unsettled ledger accounts, and sundries not included in any of the foregoing items. The amounts expended for rent and for interest were also required. The results obtained

in answer to these questions were certainly far in advance of the showing for capital in prior census reports, but all reports as to capital are, from the very nature of the items to be returned, open to criticism. The reports of the eleventh census are the results of an honest, and apparently an exhaustive effort to secure a full return, and the criticisms of them have been almost exclusively on the theory that it is impossible to obtain an accurate report of capital in answer to any series of questions that may be formulated.

The amount of capital, including the value of hired property, is reported as $7,681,381,543. A large proportion of this total is of necessity an estimate, or rather the accumulation of hundreds of estimates made by as many different proprietors, and it can not be seriously contended that each has made a careful estimate and included all amounts that should be reported. The great diversity of items, and the constant shifting of some of them renders it impossible to secure an accurate return even of those items that appear on book accounts.

Given a series of questions concerning capital that are theoretically complete, a competent agent assisted by the most willing, experienced, and well informed proprietor will find great difficulty in securing a satisfactory report. But this happy combination of an obliging, well informed proprietor and experienced agent is something that is practically unheard of in a census canvass. The result is that the answers to this, the most difficult of all census inquiries, have been unsatisfactory. Complete answers to the questions necessitate a careful estimate of the values to be placed on the real estate and improvements. If this is owned by the proprietor he is probably in a position to make the estimate, but if it is not owned by him, the agent is forced to hunt up the

owner, or estimate the values, using the amount paid as rent, taxes, or some other equally unreliable factor as a basis.

The value of the items of live capital, such as raw materials on hand, stock in process and finished products on hand are also almost entirely matters for estimate. The instructions to the special agents stated that "the amounts given in answer to these questions should be estimated at the present selling value of such products." These items, as well as the amount of cash on hand, bills receivable, unsettled ledger accounts and sundries, evidently contemplate that a particular day during the year should be considered, and the values for that day only reported. This is unavoidably so, because the amounts and values of each of the items shift and change from day to day, but notwithstanding the necessity for fixing such a date, the schedules and instructions are silent on the subject. In the majority of establishments operating under ordinary business pressure it is probable that the amount of raw material on hand, stock in process and finished products will not vary greatly during the year, but it is not at all improbable that an establishment may be operated under such conditions that there would be a great variance in the values reported for these items at different times. It is certain that in the majority of establishments the amount of cash on hand, bills receivable, and unsettled ledger accounts depend entirely on the exact date for which the report is made. All the questions in the census schedule cover the business of the establishments for one year, but the question concerning capital should be limited to some particular date, otherwise the amount of live capital reported will depend entirely upon the whim or agreement of the agent and proprietor.

It has been suggested that in estimating the amount of "credit capital" the interest paid during the year could be used as a basis, and this plan was originally contemplated by the Census Office, but, after mature consideration, abandoned as impracticable. Credit capital was understood to mean, not the credit of the establishment, but the extent to which that credit had been utilized. It is manifestly as impossible to estimate the total credit of an establishment as it is to estimate the extent to which that credit has actually been employed in the business during the year. For instance, some materials may be purchased on time and no interest paid, while the bills of other materials carry interest. Both are items of credit capital, but the amount of interest paid is no criterion from which the sum of both credits can be estimated.

The contingencies and intricacies surrounding any inquiry concerning capital satisfied General Walker that it was impossible to secure reasonably accurate data on the subject by means of a popular canvass, and he advocated the abandonment of the inquiry, stating "that it ought never to be embraced in the schedules of the census." While it cannot be contended that the statistics of capital for the eleventh census completely meet the criticism of General Walker, his objections to the inquiry as it appeared in prior census schedules, and all other criticisms were carefully followed in formulating the inquiries, and I believe the defective results are due, not so much to the form of the inquiry as to the inexperience and lack of knowledge on the part of the enumerators and the unwillingness of the manufacturers to furnish information on the subject. I do not agree with those who advocate the abandonment of the inquiry and would prefer to estimate the capital, using the relation-

ship between product and capital, and the general knowledge of conditions prevailing in industry as the basis. Estimates of that character can be made, and they may come very near the truth, but how near there is no way to determine; they will be rightly subject to more just criticism than the results of an honest effort to obtain the actual facts from each proprietor. If the amount of capital is estimated, the value of the products, not only of manufactures but of agriculture, can be treated in the same manner, and the field for results open to all kinds of criticism extended indefinitely.

To the ordinary business man the term "capital" indicates an amount that is capable of being determined with a reasonable degree of accuracy. It is only in the exceptionally large establishments where the intricacies arise, but from a practical business standpoint, no proprietor would be willing to acknowledge that he did not know how much capital he had invested in his business, and this is especially true of large establishments. I believe that all manufacturers who have any system about their business have a definite idea of the amount of their capital, and if they are inclined to furnish the information it can be secured with as great a degree of accuracy as can the value of products, or any other facts connected with the census.

It is contended that in many classes of industry it requires about one dollar of capital to produce a dollar's worth of product. The census reports show that for all industries throughout the entire country it required 82 cents' worth of capital to produce one dollar of product. Estimates could be prepared to make these results conform more closely to a statistician's idea of the general conditions of business, but to the ordinary reader the estimates made on a theoretical basis and to conform

exactly to a preconceived idea, would not be accepted with the degree of satisfaction that a compilation of reports coming from individual manufacturers as to their own business would be. From an exact statistical standpoint all the census totals are untrustworthy, and it is possible that the degree of error is a shade greater in the reports of capital, but I do not believe that the cost of gathering the data for capital bears a greater ratio to its usefulness than does most of the census statistics. The expediency of retaining or omitting the inquiries because of the opposition to furnishing the information appears to be the feature that should receive the most earnest consideration at the next census. To the ordinary reader the industrial statistics will be very incomplete without some presentation concerning capital.

WILLIAM M. STEUART.

The earliest attempts to collect statistics of manufactures in America were undertaken in colonial days by the ministry of the colonies. Always jealous of industrial growth in the colonies, and wishing to favor the home manufacturer and exporter, the ministry would issue from time to time a circular letter to the king's representatives in America, calling for general reports on the population, trade and industries of their governments. Taken as a whole these reports are of high interest, but do not attempt to distribute the various subjects by counties or sub-divisions. They are therefore too general for determining industrial growth, yet served very well their immediate purpose. At a later time, when the states were still fighting for their independence, the French minister to the United States set on foot inquiries into the resources of the different parts of the continent. These inquiries were addressed to individuals, supposed to be the best informed upon the conditions of their states, and the replies were sent to France for the information of that power, then dreaming of depriving the English of their American commerce, and desirous of monopolizing it for its own benefit. Again, however, the replies were of too general a nature to be useful in detail; though, when brought together, they are of value and are safe guides to the distribution among the states of the leading commercial and industrial interests.

On the formation of the national government Hamilton began to collect materials for his notable report on manufactures, and corresponded freely with his friends and subordinate officers on the subject. The mass of

information thus gathered was the basis of his report; but the details have remained unpublished, and still exist in manuscript. As a whole, it could give the first general census of manufactures by states and even by districts; but the many omissions and the multiplicity of separate and individual reports would make any conclusions misleading. As no rules for reporting facts were laid down by the Secretary, but each correspondent left to adopt his own method of selecting and reporting his information, it would be difficult to combine the material into formal tables, or even to compare returns received from different correspondents in the same state or minor division of a state.

In 1813 Tench Coxe prepared "A Series of Tables of the several Branches of American Manufactures, exhibiting them in every county of the Union, so far as they are returned in the Reports of the Marshals, and of the Secretaries of the Territories and of their respective assistants in the autumn of the year 1810: together with Returns of certain doubtful Goods, Productions of the Soil and agricultural Stock, so far as they have been received." This is the first formal connection of an inquiry into manufacturing industries with the national census. The result was more curious than valuable, though it seems not only to give a list of the industries then pursued, but their geographical distribution. It is scarcely necessary to add that the classification of industries is very imperfect, and the returns are confessedly incomplete. In some cases only the number of works is given; in others the quantity of product is given but not the value. The division of industries is hap-hazard, and in only a few instances are the products consumed in the mills mentioned or measured. With all its drawbacks the compilation is interesting, and where the

county and city have the same limits, as in New York, or where an important city is in a county, as Boston in Suffolk, a crude understanding of city industries may be reached. Philadelphia is, indeed, separated in the returns, in deference doubtless to the fact that it was Coxe's place of residence.

To this point in the development of the census the question of labor had not entered. Much of the industry of the country was hand work and pursued in the family not as a distinct and engrossing occupation, but at odd times, when farming operations were light. The tables do not state whether the industry is carried on by hand or by machine, though the general class of "labor-saving machinery," confined principally to textile machines, might serve as a general guide. The number of "mules," "billies" or "jennies" is given, but that is no index to the number of hands. It was not until the census of 1820 that the enumeration of labor was introduced.

In the fourth census the marshals were directed to return

1. Number of persons engaged in agriculture.
2. Number of persons engaged in commerce.
3. Number of persons engaged in manufactures.

But household manufactures were not to be included in determining the enumeration. The criterion then for deciding what persons should be returned in the third class was the principal, and not the occasional or incidental occupation of their life. Further, "in the column of manufactures will be included not only all the persons employed in what the act more specifically denominates manufacturing *establishments*, but all those artificers, handicraftsmen, and mechanics, whose labor is preeminently of the hand, and not upon the field."

An alphabetical list of manufactures was also given to the marshals and they were directed to ask the following questions:—

Raw materials employed: 1. The kind? 2. The quantity annually consumed? 3. The cost of the annual consumption?

Number of persons employed: 4. Men? 5. Women? 6. Boys and girls?

Machinery: 7. Whole quantity and what kind of machinery? 8. Quantity of machinery in operation?

Expenditures: 9. Amount of capital invested? 10. Amount paid annually for wages? 11. Amount of contingent expenses?

Production: 12. The nature and names of articles manufactured? 13. Market value of the articles which are annually manufactured? 14. General remarks concerning the establishment, as to its actual and past condition, the demand for, and sale of, its manufactures.

Unfortunately the act imposed no penalty for refusing to reply to these questions, and such answers as might be given were to be the voluntary act of the manufacturer. He was at liberty to ignore them entirely. Whatever returns were made by the officers of the census were never published, nor was any indication given by the Secretary of State of their completeness or availability.

It is safe to believe that the attempt was not successful, and it is not necessary to examine in detail the schemes of the censuses of 1840 or 1850. In the latter year the schedule covering manufactures was more full and included the average monthly amount of wages paid for all the labor of all the hands, male and female, employed in the business or manufacture during the

course of the year."[1] Again were the replies to these questions made a voluntary act of the manufacturer, and again was the information collected not published in a collected form. The instructions issued in 1860 were similar to those of 1850, but the published returns were compiled by counties, thus following the example set in 1810. At the close of the war, in 1866, the House of Representatives called upon the Secretary of the Interior for a statement of the "aggregate amount of manufactures of all kinds, of each city and village in the United States having a population of ten thousand persons and upwards, as shown by the census of 1860." The result, a pamphlet of four pages[2] was the first compilation of its kind, and marks the beginning of a published census of industries in cities. Only a few facts were given: the capital in manufactures, the male and female hands employed and the value of the product. It is thus seen that only a part of the information called for by the schedules was thus utilized.

In the ninth census, that for 1870, the city returns were not called for, and it was not until the census of 1880 that they became a feature in connection with the statistics of manufactures. As the inquiry into city factories would cover the larger part of the manufactures of the country, the cities were set apart for special enumerators. It was rather for administrative convenience than because of any scientific interest that this was done, and the sparing use of the returns was good evidence that the able superintendent—General Walker—did not lay stress on the division for any statistical conclusions. In 1890 the separation becomes distinct

[1] Seventh Census, xxiv.

[2] Ex. Doc. No. 29, 39th Cong., 1st Sess.

and a volume is devoted to the industrial statistics of cities.[1]

It may be stated at the outset that the establishments classed as "city" industries comprise more than one-half of the total number covered by the industrial census. In other respects the relative importance is even greater: 61 per cent of the capital; 62 per cent of the employees; 68 per cent of the total wages; 65 per cent of the cost of materials used; and 67 per cent of the total value of products. If the census were confined to these establishments the economic results would be quite as valuable as for the whole country, and in certain lines even more valuable, because the general average would be based upon particulars more nearly alike and varying between less widely separated expenses.

The first noteworthy feature of the returns of city industries as contemplated in the census scheme is the immense amount of waste labor expended. The inclusion of "industries" having an annual product of $500 or more fixes the limit of exclusion at too low a line.[2] To compare the general or individual economy of an establishment producing a million dollars a year in product with one yielding $500 is out of the question. There are some common features, it is true; but those features are of secondary interest. In wages, the local trade union may control the rate paid in the smaller as well as that given in the larger interest; but outside of wages, there are few comparable elements, and the vital points are so overburdened with masses of returns as to make a deduction from them an impossibility. To place a single blacksmith or a carpenter in the same class with a foundry or a steam furniture

[1] Eleventh Census. Manufacturing Industries, Part III.

[2] See above, p. 270,f.

factory is to do what must at once be condemned as futile. The "average" is an ideal and inapplicable figure. Yet this is precisely what the census does. Further, in the returns of 1890 there are incomplete figures for some very dubious occupations, such as "dentists", though professional occupations, to which that of dentist is more closely allied than to mechanical or manufacturing industries, are omitted.

In 1880 the industrial statistics of 279 cities were collected, but only those for 100 cities were published. In 1890, the returns for 165 cities were published, but in such a form as to make comparison with the returns of 1880 for the same cities almost out of the question. It may not be a cause for regret that the schedules of 1880 were not used in 1890, for the latter are more full and detailed; but the incident shows in what an unformed condition this class of statistics now is, and how inchoate are the results for any practical purpose.

It must be borne in mind that these city returns are given to special enumerators, and are not covered by the general staff. The city district is set apart, as it were, from the general scheme, though reporting under the same schedules. Further, the great industries, such as iron and steel, cotton, glass or woolens, are entrusted to "expert" reporters, and are thus more closely studied than they could ever be under a general examination by a reporter of the ordinary type and inexperienced in technical detail. Yet these expert reporters do not make any distinction between a "city" and a "country" industry. The situation of an iron works or a cotton mill may be influenced by local conditions; but there is no attempt to isolate these conditions so as to determine the conditions that are common to the interests wherever they may be placed geographically.

Taking up the subject more in detail, and using only the returns of 1890, a more precise judgment may be formed of the special methods or usefulness of the city industrial statistics.

The larger establishments are as a rule situated in the cities; therefore, if the figures are correct, they use the larger capitals, employ more labor, and secure a better return. The difference in the value of city and country land would alone make a difference in the average investment of capital; but this difference is in a measure overcome by the larger amount of "direct investment" in the country against hired or rented property in the city. Bearing this distinction in mind, one is not inclined to accept as final the estimate that to produce $100 of produce in manufacturing operations, $63.66 in capital was required in the cities, and $81.72 outside of the cities.[1] No conclusion can be drawn from that comparison, for the detail of no two localities or no two establishments in the same locality would be the same. No general compilation of rentals or even assessed valuation of lands and buildings could bring us nearer to an appreciation of essential differences in the economy of manufactures.

The problem of "cost of production" is an interesting one to the economist, yet no one would think of accepting the census returns for determining that cost in any one industry. Wages paid to labor and the cost of materials used in the manufacture were regarded by the census for 1880 as the leading and almost the only elements in the cost of production. Some of the conclusions drawn from the census of 1880 on this point were of a startling character, and directed attention to a large class of expenses that were properly chargeable

[1] Eleventh Census. Manufacturing Industries. 2: xvi.

in the cost but of which no account had been taken. The estimates of profits reaped in certain industries, based upon the census of 1880, were such as to lead the manufacturers to insist upon the inclusion of many expenses incurred as "miscellaneous," outside of what had been paid for labor and materials. The result was the extension of the schedule on manufactures in 1890, by a number of separate items as follows :—

Rent paid for tenancy,
Taxes, including internal revenue,
Insurance,
Repairs ordinary, of buildings and machinery,
Amount paid to contractors,
Interest paid on cash used in the business,
All sundries not elsewhere reported.

The interest on capital and the depreciation of plant were not included.

For the whole country these miscellaneous expenses amounted to somewhat less than one-tenth of the capital employed and were more in the cities, where they amounted to 11.4 per cent of the capital reported.[1] Yet it may be questioned whether the difference was worthy of special investigation, even on the imperfect schedule presented. Measuring the results by the value of the product we have the following: "In the 165 cities the materials constitute 53.57 per cent of the value of the product, wages 24.97 per cent and miscellaneous expenses 7.24 per cent. In the United States exclusive of these cities the cost of materials is 58.14 per cent of the value of the product, wages 23.13 per cent and miscellaneous expenses 5.70 per cent; the total for these cities being 85.78 per cent as compared with 86.97 per cent

[1] *Idem*, xi, first table.

in the country exclusive of the cities."[1] The real difference shown by such a standard lies in the cost of the materials, but he would be an overbold statistician who should undertake to base any conclusion upon such a factor, when every item of cost must be traced back to the point of origin, and all the varying conditions of market and transport must be described.

So far as the returns of "miscellaneous expenses" are concerned, there was little gained by isolating them and by seeking to give them in detail. For the cities, the total was $454,844,850, and the largest items were "all sundries not elsewhere reported" ($161,601,894), and "taxes, including internal revenue" ($112,597,927), these two items being more than 60 per cent of the total.[2] So general a class as "sundries" is worthless for statistical purposes, and the census reporter expressly states[3] that the amount reported for taxes "cannot be considered as an indication of the rate of taxes paid on land and buildings," an almost unnecessary warning because the inclusion of "internal revenue" taxes would have made the returns useless for ascertaining such a rate. The favors in matters of taxation granted by some states to manufacturing undertakings must be known before the different amounts charged in localities could be determined; and surely a distinction should be made between taxes on lands and buildings, those on licenses or permits, and those on consumption. Upon the whole I do not see that the extension in 1890 of the schedules in detail in the direction of miscellaneous expenses was called for, or has proved of service to statistical inquiry, and whatever utility might have been ob-

[1] *Idem*, xvi.
[2] *Idem*, xviii.
[3] *Ibid.*

tained from it has been neutralized by the failure to publish the returns for the whole country in the same form as the city returns were published.

The number of workers, their age and sex, would be gathered under any conditions. It remains only to pass upon the merits of separating the city workers from the country. In general the average number of workers, other than "officers, firm members, and clerks" was 14.02 for city establishments, and 9.69 for other works. This merely tells us what was already known, that the city factories are larger on the whole than those of the country. The distribution by sex is a different question, and on this the census has thrown important light; but the same information could be obtained when dealing with "occupations," and in quite as complete a form. As to wages, averages are most unreliable. It conveys no definite idea of the status of the laborer to say that the skilled male in New York earns an average wage of $594, while the unskilled earns $434. It will not add to the definiteness to limit the figures to the makers of boxes, or of knit goods, or any one industry. There is no single line of production in any city so homogeneous in conditions as to offer an approach to a fair average, and those conditions tend to become more different in the various cities, even in the same city. No one can study the geographical distribution of the 'business failures' without being impressed by the fact that the industries are in a state of perpetual movement, and all their relations, internal as well as external, must be modified accordingly.

What application can be made of the information based upon averages, that the average annual earning of a laborer in city factories is $491.26 and in country establishments, $370.95? At first thought the figures

might be accepted as evidence of a different economic regime in the two descriptions of works. In reality it is proof of what could be ascertained by a number of other and really safe methods, that the tendency of labor in cities is to rank higher in skill and in general qualities, than in the country. Or, that the fact of the laborer not having a cottage supplied him, adds to the cost of living and so the wage must at least cover that.

In general the rent and wages of labor are higher in the city, and the manner of housing the workingmen is different. In place of cottages owned and rented to the worker by the mill corporation, the laborer houses himself and his family. In place of a "company store", the ordinary distributing shops are patronized. Instead of a monopoly in homes and supplies, freedom exists, and the worker is more independent of the mill corporation. His wages are higher than are paid to his rural competitor, but his expenses are also greater. He is under the same influence that obliges his employer to pay a higher rent and higher taxes to the city for his mill than would be paid in the country; but the advantages of a city site may more than compensate for this difference.

A number of conclusions might be loosely drawn from the comparative averages, but only a few could endure more than a cursory examination. For these averages are based upon an immense conglomerate mass of details, and as often as not include additions composed of very different items. A mill enjoying the free use of water power stands on another footing than the mill that is run by steam. One that is situated on the bank of a navigable river is in a more favorable place than a mill far inland and obtaining all its supplies and shipping all its product by rail. The cotton mill that is near the

cotton field has an advantage of position over the mill that must obtain its raw materials from a distance. But the more distant mill may make a product of so much finer grade or quality as to remove any real competition between the two. Even in the same city two establishments classed under one industry may differ so widely in method and in labor as to have no points in common save the name and the raw materials. The credit of the mill is also a factor, enabling it to carry larger stocks of raw materials or of product and at a lower cost than a competitor not enjoying the same degree of credit. To buy in a low market and sell in a dear one requires capital to take advantage of the former condition and to wait for the latter. The question of urban or rural situation does not enter into the problem, directly or indirectly.

In the reports of the National Department of Labor the distinction of city and rural industries is not noticed or made a feature; nor am I able to trace more than an incidental reference to it in the reports of the Massachusetts bureau of statistics of labor. It has not become, nor is it likely to become, a matter of special inquiry under these expert bureaus save as secondary to a social investigation. The labor department of the English Board of Trade has never entered into a general study of the matter, nor do I find that the similar bureau of the French government has so much as glanced at the subject. "London" is properly one of the districts into which the Board of Trade has divided England, just as "Paris" is recognized in France. But neither administration has sought to take a census of all the industries contained in its respective cities, much less to obtain a "general average" of capital, raw material and product.

I question whether there is any method for obtaining acceptable results in this description of investigation, without confining the inquiry to a few establishments in one line of industry, which are working on nearly the same conditions. In other words, I doubt if a general investigation, even in the hands of the most expert, will produce what can be recognized as good statistics. In coming to this conclusion I practically rule out from the census as a separate branch of inquiry city industrial statistics. In my experience, I have never been called upon to refer to the city volume save to decide a question evidently caused by some local jealousy as to the importance or rank of a city in a certain industry; nor have I ever quoted a figure from it except to show how imperfect was the information to be obtained. I see no good object to be gained by continuing the separation in future census work, and it stands in the past as labor expended on a non-essential distinction, unwarranted by a scientific application of statistical method. Even the totals for the whole country are open to grave criticism; but those for cities introduce a further element of vagueness, and tend to confuse by the added complexity.

While thus rejecting the city as distinct from the rural industries from a scheme for a national census, it does not follow that there is no field here for investigation. The best results can be obtained by taking up special industries, and turning the study over to skilled observers. The French *Office du Travail* has issued two reports on "La Petite Industrie (Salaires et Durée du Travail)," and confined the inquiry to Paris. The one treats of "L'Alimentation à Paris," the other of "Le Vètement à Paris." Both have been conducted on general lines, and naturally avoid "averages." In like manner the labor department of the British Board of

Trade has published a special study by Miss Collet on the "Changes of the Employment of Women and Girls in Industrial Centres. Part I, Flax and Jute Centres." Here there is no such separation of city and country establishments as is made in the census of the United States; but there are special investigations, limited in scope and conducted on special lines, by an expert reporter. It seems to me that such material has a value of its own, and sufficiently marked to warrant the collection and publication. But it is very different from that obtained in the general returns of the census, and more nearly approximate to the reports on special industries included in that work. It is in this direction that valuable work has been done; but its utility would have been lessened had there been an instruction to treat city mills as something different from those not in cities. I repeat, it is a distinction that is non-essential, needlessly perplexing and should not be recognized in any future census.

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Boston Public Library.

In the United States, the Federal census presents the earliest official data concerning statistics of wages. The censuses of 1850 and 1860[1] made exactly the same inquiries upon this subject. In both cases the schedules[2] called for "the average number of hands employed", male and female, and the "average monthly cost" of male labor and of female.

It must be remembered that in these censuses, as well as in that of 1870, the enumeration was conducted by the United States marshals, who, upon their regular rounds, called upon manufacturers and gathered data. No prior schedules were used, and the marshals received only fifteen cents for each manufacturing establishment enumerated.[3] Under the circumstances the work of collecting data relating to employees and wages could not be carefully and intelligently done, except in the rarest cases, while the enumerators failed to visit any establishments that it seemed convenient to omit. No great value, therefore, can be attached to statistical tables based upon such uncertain materials.

In explanation of the schedules employed, the enumerators in the seventh census were given the following instructions:[4] "Under the general heading 'hands employed', is to be inserted . . . . . the average number of each sex employed during the year in the manufacture or business. These numbers are to be es-

[1]It is not necessary to refer to the questions asked in 1820 and 1840 concerning hands employed and total wages paid. For the schedules used in these censuses see Report on a Permanent Census Bureau, 140, 145, Senate Executive Documents, 1, 52d Congress, 1st Session.

[2]*Idem*, 148, 152. See also Seventh Census, xxiv.

[3]See remarks of General Walker, in Ninth Census, 3 : 391.

[4]Seventh Census, xxiv.

timated either by an average of the whole year, or by selecting a day when about an average number was employed, and inserting the number on such a day as the average." "Under heading 10 and 11, entitled 'Wages', is to be inserted the average monthly amount paid for all the labor of all the hands, male and female, employed in the business or manufacture during the course of the year. In all cases where the employer boards the hands, the usual charge of board is to be added to the wages; so that cost of labor is always to mean the amount paid, whether in money, or partly in money and partly in board; and the average number of hands and the average monthly wages are to be returned, so that by dividing the latter by the former the result will show the average earnings of individuals. This is also to include the individual labor of a producer, working on his own account, whose productions are separately enumerated."

If the enumerators attempted to follow these instructions, it is evident that the average number of employees reported must be in most cases a mere estimate, not a true average. In the next place, the directions given for a determination of average monthly wages were highly unfortunate. In most cases the total yearly wages can be easily and quickly ascertained. To attempt to estimate average monthly wages with a staff of untrained and underpaid enumerators must lead only to confusion. Remembering, finally, that most of the marshals did their part of the work as carelessly and hastily as possible, we can conclude only that the number of hands employed and the average monthly wages could not have been ascertained with even reasonable accuracy. The average yearly earnings deduced from such data must have been grossly inaccurate. The

study of subsequent censuses will serve to reinforce this conclusion concerning the wage statistics of 1850 and 1860.[1]

In addition to the materials just described, the seventh and eighth censuses provided, in the schedules of social statistics, general questions concerning the average wages of farm hands, laborers, carpenters, and domestics.[2] In the eighth census the results were published.[3] Of course the answers consisted mainly of conjectural averages, and can possess but slight value, at least for purposes of comparison. In 1870 these inquiries were wisely omitted.

In 1870 the questions asked in the census schedules of manufactures were greatly changed, and alterations were made in the form of inquiry concerning employees and wages. General Garfield's report had recommended that a sharp separation of firm members and hired laborers should be enforced, and that the schedules should call for the "Amount of wages paid during the year."[4]

The wisdom of both recommendations is too apparent to need any discussion. The schedules finally adopted[5] called for the average number of hands employed, males above 16, females above 15, children and youth; and for the total amount paid in wages during the year.

In the ninth census, as in the eighth and seventh, the reports of the enumerators brought in results that were

[1] In the census of 1850 the tables of manufactures have been found "arithmetically imperfect," but it is not known whether the errors are in the items, or the totals, or in both. See Ninth Census, 3: 393, note.

[2] Report on a Permanent Census Bureau, 149, 153.

[3] Eighth Census, Mortality and Miscellaneous Statistics, 512.

[4] Report of Committee on Census, 1870, p. 55. House Report, 3, 41st Congress, 2d Session.

[5] Report on Permanent Census Bureau, 167; Ninth Census, 1: xxxi.

obviously defective. General Walker caused special investigation to be made by the Census Office, with the result that thousands of establishments omitted by the marshals were included in the report upon manufactures.[1] The final tables were admittedly defective, although much more complete than those of any previous census. This is apparent from the enormous increase in the total number of establishments reported.[2] We must now consider the manner in which the statistics of wages were affected by the inclusion of this large number of establishments not previously enumerated. This is a matter of importance because the statistics collected by one census have been compared with those presented in the others. From such data, average rates of yearly earnings have been deduced, and misleading results have been reached.[3]

With the frankness characteristic of its superintendent, the Ninth Census states explicitly that the enumeration of industrial establishments had been much more thorough than ever before, although it was still far from complete. It was shown that in 1860 the census had

[1] Ninth Census, 3 : 374.

[2] This number at each census was :

1850	123,025
1860	140,433
1870	252,148
1880	253,852
1890	355,415

Eleventh Census, Manufacturing Industries, 1 : 67.

[3] The census volumes usually have compared total wages paid and the aggregate number of hands employed from decade to decade. Prior to the eleventh census, the writer can find no actual computation of the average rate of wages of the entire country. See Eleventh Census, Manufacturing Industries, 1 : 19. But many writers have computed average rates of wages from these census figures, and such computations have been widely quoted as official statistics. See Carroll D. Wright, in *Atlantic Monthly*, 80 : 305, Industrial Evolution of the United States, 191 ; Mulhall, in *North American Review*, 160 : 647 ; Jeans, in *Fortnightly Review*, 58 : 752.

returned, in its tables of occupations, 450,634 artisans employed as painters, carpenters, blacksmiths, and coopers.[1] Of these, only 39,389, or nine per cent, were accounted for in the statistics of manufacturing and mechanical pursuits. Now the total number of employees enrolled in the tables of all manufactures was 1,311,246. The omission of 411,000 skilled artisans in these four trades removed from the statistics of wages a number of high-priced laborers that amounted to 31 per cent of all the persons enumerated. The census returns showed an average wage of $289 for all persons employed: while carpenters received $429; painters, $415; blacksmiths, $307; and coopers, $311. It is evident, therefore, that the average wages computed from the eighth census are smaller than they would have been if these classes of skilled laborers had been more fully enumerated. Now in the ninth census General Walker took pains to secure more complete returns of persons employed in manufacturing and mechanical industries. As a result, 155,000 artisans were enumered in these trades, as given in the statistics of manufactures. This was over 25 per cent of the whole number of such workmen included in the statistics of occupations. This fact, alone, must have tended to increase the average wage that has been deduced from the wage statistics of the ninth census, and to render difficult a comparison with the rates of the earlier censuses.

Great changes were introduced into the methods adopted by the tenth census in collecting the statistics of manufactures. The superintendent was authorized to withdraw the collection of such data from the regular enumerators, and to employ special agents where he considered such a method advisable. Accordingly, in

[1] Ninth Census, 3: 373.

279 principal cities and towns, the statistics of manufactures were gathered by special agents.[1] As a result, manufacturing establishments in these largest industrial centers were more fully enumerated than ever before.

From the copies of the schedules that have been published[2] it would appear that the tenth census asked for the "total amount paid in wages during the year" and the "average number of hands employed," males above 16, females above 15, children and youths. These questions were the same as those used in the preceding census. In addition, the tenth census called for the "greatest number of hands employed at any one time during the year," and asked for estimates concerning the "average day's wages" for a skilled mechanic and for an ordinary laborer. Such answers as were received to these last questions seem not to have been published.

It is evident that the superintendent of the tenth census thought that the statistics gathered concerning the number of hands employed represented the average number for the census year.[3] But this was clearly a mistake. An examination of the original schedules of the tenth census has shown that the figures of the average number of hands employed, for nearly one-half of the establishments, were the same as the greatest number of hands employed at any one time during the year. In the remaining establishments the statistics of the average number of hands represented the number employed during the weeks of the busiest season. As a result, the tenth census failed to get the average number of persons employed in manufactures; and, instead,

[1] Tenth Census, 2 : viii.

[2] Report on Permanent Census Bureau, 167.

[3] Tenth Census, 2 : xxviii.

secured a number "almost always more than the average and often several times the average."[1] This is conceded in the eleventh census, which states:[2] "The questions used in 1880 tended to obtain a number of employees that would be in excess of the true average, while it is believed that the questions used in 1890 have obtained, as nearly as possible, the average number."

A comparison of the tenth census with the Massachusetts census of 1885 will make it evident that the tenth census secured a number of employees far in excess of the average number. The Massachusetts census ascertained the total hands employed during the year, and the total wages paid to the 419,966 employees thus enumerated. From these figures an average wage of $351.02 was computed.[3] The census of 1880 enumerated 352,255 employees in the State of Massachusetts; and from its statistics, the averages wages for the state appear to be $364.[4] These results correspond fairly well, when it is remembered that the Federal census secured in some cases a number of employees less than the total number employed during the year, and therefore used a smaller divisor than was employed by the Massachusetts census. Now, in 1886, the Massachusetts bureau began the publication of its annual reports upon manufactures. In these the bureau ascertained the average number of hands employed, and used this number as a divisor in computing average wages for the state. As a result, an average wage of $395.89 was computed in 1886,[5] or

[1] Letter of Frederic C. Waite, who made the examination. Published in *American Journal of Sociology*, 3 : 360–361. See also the quotation from Carroll D. Wright, upon same page.

[2] Eleventh Census, Manufacturing Industries, 1 : 14.

[3] Massachusetts Census, 1885, 2 : xci.

[4] Tenth Census, 2 : 15 (folio page).

[5] Statistics of Manufactures, 1886, 51.

$44.87 more than the average wages in 1885 as shown by the state census. This difference in due, of course, to the employment in 1886 of a smaller divisor than was used in 1885. The state census of 1885 took pains to ascertain not only the total number of hands employed during the year, but also the number employed upon June 30, 1885.[1] If we assume that the number employed upon June 30 approximated the average for the year, and use it for a divisor, we can deduce an average wage of $389 from the census of 1885. This differs from the average wage computed for 1886, in the statistics of manufactures, by only six or seven dollars. A study of these figures will make it apparent that the Federal census of 1880, like the state census of 1885, really secured for Massachusetts a number of operatives far in excess of the average number, and differing but slightly from the total number employed during the census year.

One other matter should be mentioned at this point. The tenth Federal census did not ask for the number of "officers and clerks" except in a few of the textile industries.[2] Its figures represent, therefore, the number of laborers and the wages received by them in nearly all cases, except those in which the persons who filled out

[1] Massachusetts Census, 1885, 2 : xci. The total number employed during the year was 419,966; while the number employed on June 30 was 379,328.

[2] In some of the textile industries the schedules called for information concerning the number of "officers and clerks." See Eleventh Census, Manufacturing Industries, 1 : 13; *Journal of Political Economy*, 4 : 89. In the cotton industry the number of such persons as "officers and clerks" is given as 2,115; but their wages are not included in the total wages, and they are excluded from the total number employed. Tenth Census, 2 : 955 (folio page). In the woolen industry, on the other hand, 1,302 officers and clerks are included in the table of total employees, and probably their wages are also included. Tenth Census, 2 : 967 (folio page).

the schedules reported the number of officers and clerks with the other employees. When this was done, Mr. Waite found that the officers and clerks "were not credited with any wages except in exceedingly few cases".[1]

In addition to the data contained in the statistics of manufactures, the tenth census devoted a special volume to the subject of wages.[2] This was prepared under the careful direction of Mr. Joseph D. Weeks. It related to wages in fifty-three of the more important manufacturing industries, and also presented much valuable information concerning methods of remuneration, regularity of employment, and similar subjects. Some of the materials were drawn from as early a period as the the decade from 1830 to 1840, and possess considerable historical interest.

Mr. Weeks attempted to select, in each industry, typical establishments of recognized credit and standing, and to make the returns as accurate as possible. The various classes of employees were carefully distinguished, and only those classes were finally selected whose work had not materially changed in character during the period covered by the report. Thus it is probable that the data collected are thoroughly comparable. The schedules called for "rates of wages or average earnings" for each class of employees, by the day, week, month, or year, or by the piece. It was found that the "rates of wages at the several works of the same class in a given district do not vary much for a given class of labor"; and Mr. Weeks expressed the belief that the

[1] *American Journal of Sociology*, 3 : 360. This point is discussed, but not clearly, in the Eleventh Census, Report on Manufacturing Industries, 1 : 13–14. See also *American Journal of Sociology*, 3 : 626.

[2] Tenth Census, 20. Report on the Statistics of Wages in Manufacturing Industries.

report would "furnish the means for obtaining a fair average for the whole country".

With all the care that was taken in selecting establishments for investigation, the first sets of returns were often unsatisfactory. In these cases Mr. Weeks called attention to defects, and asked for corrected data. The chief difficulty seemed to be in securing a uniform classification of employees in establishments of the same class, and uniform units of payment. Sometimes schedules were "passed backward and forward several times before a final adjustment was reached."

Mr. Weeks confined his attention to the collection of trustworthy and comparable materials, and did not attempt to compute average rates of wages for all establishments. Thus the report presents materials rather than final results. It collects as many facts as possible concerning wages in important establishments, and leaves to the reader the work of comparison and combination. The report undoubtedly deserves high praise. If any criticism can be passed upon the materials here presented, it grows out of a circumstance that was beyond the control of Mr. Weeks. The average wages of each class of laborers in each establishment were generally computed in the counting rooms; and under these conditions there must have been some danger that the book-keepers would select an arithmetical mean instead of computing a true average.

The eleventh census devoted no special report to the subject of wage statistics. The establishment of the United States Department of Labor in 1885 rendered such an investigation less necessary for the Federal census. The statistics of manufactures, however, contained the customary inquiries concerning employees and wages.

In 1890 the investigation into manufacturing industries was much more complete in towns and cities than it had ever been in earlier censuses. The superintendent was able to place 1,042 cities in the hands of special agents, as against 279 cities so treated in the tenth census. In country districts, on the other hand, the canvass was far less thorough;[1] and there is reason for thinking that in these cases the eleventh census was more defective than the tenth. The official who was in charge of this branch of investigation has written:[2] "I am confident that in the rural districts, as a whole, the canvass of 1880 resulted in securing a larger number of reports than did that of 1890." These facts have an important bearing upon the comparability of the wage statistics of the two censuses.

The schedules used in 1890[3] called for a more minute classification of laborers than had been attempted before that time. As published, the tables distinguish three

[1] On this point the census says: "Under these circumstances, the canvass of the cities was more thorough than that of the rural districts, and the apparent decrease in some industries and some states is due, in part at least, to the less efficient canvass by the general enumerators. The defective canvass of the enumerators is more apparent in the totals for states in which there are comparatively few large cities, such as Nevada, or for industries conducted largely by establishments located in the rural districts, of which 'Leather, tanned and curried' is an example." Eleventh Census, Manufacturing Industries, 1: 1. Mr. Robert P. Porter says concerning the returns of manufactures furnished by the regular enumerators who operated in country districts: "Except in a few isolated cases the returns of productive industry secured by these enumerators have proved utterly valueless, and hence the Census Office, in order to obtain accurate data, has been subjected to heavy outlay in securing correction and reproduction of the returns." Report on a Permanent Census Bureau, 18, f,

[2] *American Journal of Sociology*, 3: 624. See also letter by Carroll D. Wright, quoted in *Journal of Political Economy*, 4: 89.

[3] Eleventh Census, Manufacturing Industries, 1: 13; Report on a Permanent Census Bureau, 178, f.

classes of workers, (1) officers, firm members, and clerks; (2) operatives, skilled and unskilled; (3) pieceworkers. Each of these classes is subdivided into, (1) males above 16, (2) females above 15, and (3) children.[1] The schedules called for the average number employed throughout the year, and the total wages paid to each class of workers. The tenth census had called for the average number of hands, but had failed to secure such data. The eleventh census carefully defined what should be considered the average number; and probably succeeded, in large measure, in obtaining it.[2] This fact, also, is important in any comparison of the tenth and eleventh censuses upon these points.

The schedules called, also, for weekly rates of wages and the average number of hands employed at each rate, as well as for information concerning the number of months that the establishments were in operation.[3] These questions were more important than any of the others for the student of wage statistics, and were in line with the best results of recent investigations. But to secure such data for the whole United States was a work of great difficulty, and one that went far beyond anything that had been attempted in previous censuses. The plan seems to have been carried out successfully in many of the more important industries. In the third volume of the report, classified wage tables are given for such industries as woolens, cottons, silks, glass, petroleum, iron and steel, etc.[4] Such statistics possess

[1] Eleventh Census, Manufacturing Industries, 1 : 19. In Table 8 of Vol. I, there is given a still more minute classification of employees in selected industries. Clerks are separated from firm members and officers, while operatives are divided into skilled and unskilled.

[2] Eleventh Census, Manufacturing Industries, 1 : 14.

[3] *Idem*, 1 : 13.

[4] *Idem*, 3 : 146, 150, 208, 230, 302, 338, 346, 356, 361, 372, 390, 397.

great value for the student of wages.[1] For him the importance of the report lies mainly in these classified wage tables. The use which the census made of the statistics concerning yearly earnings and the average number of employees is open to criticism in one respect.

The eleventh census used its data concerning hands employed and wages paid, for the purpose of computing average yearly earnings. When this is done for all classes of laborers in the United States, the average thus obtained falls so far short of being typical that it possesses little value for scientific purposes. For this reason, perhaps, the eleventh census computed also the average earnings for each class of employees; and, within each class, gave separate data for men, women, and children.[2] Such tables are open to far less objection. The census then compared the data concerning average earnings in four different ways. First it presented tables that contrasted the wages paid to employees, men, women, and children, in fifteen industries that employed a large proportion of females, and wages paid in fifteen industries that employed a small proportion. Then it gave the average annual earnings of each class of employees in the various states and territories. Next it gave similar data for each class of workers by specified industries, and finally it presented in a single table the statistics for six of the largest industries. Such a treatment of the materials tended to secure more homogeneous classes of operatives, so that the wages computed are far less unreal averages, and must be more typical of the average condition of the laborers in each class. Moreover, since in these selected branches of

[1] In Table 8 of the first volume on manufactures, the census gives the average weekly earnings of each class of employees in selected industries, as well as the total yearly wages.

[2] *Idem*, I : 20–28.

business the statistics were, for the most part, gathered at centers of industry, and by competent agents, we may fairly assign considerable value to the investigation.

In the report upon manufactures, however, there is one feature that calls for criticism. The average annual earnings per employee, exclusive of officials and clerks, are contrasted with the average annual earnings that may be computed from the tenth census. Thus we are told that the average annual wages in 1880 were $346.91, while in 1890 they were $444.83.[1] The report is careful to add that: "Owing to differences in the form and scope of the inquiry of 1890, as compared with that of 1880, previously referred to, neither of these average annual earnings for 1890 should be accepted as the exact increase during the decade." Some of these "differences in the form and scope of the inquiry" had been explained on a previous page,[2] where it was declared that "a comparison of the average annual earnings for all classes of employees as obtained from the reports of the two censuses" was "impracticable." But others were not sufficiently explained, so that it seems necessary to consider the matter at some length. If the census officials deemed the two sets of figures entirely

[1] *Idem*, 1 : 19. Including officers and clerks, the average for 1890 was $484.49. But, as such persons were not included in 1880, they were excluded from this comparison. It is interesting to notice that Mr. Mulhall blundered into the very error against which the census had given warning. He takes $484.49 as the average wages for 1890; and compares this figure with $346.91, the average wages for 1880. See *North American Review*, 160 : 647.

[2] Eleventh Census, Manufacturing Industries, 1 : 14. In his report upon the textile industries, Mr. S. N. D. North makes a somewhat similar explanation: "The increase in wages and average annual earnings for each employee, as in other items, may be due in part to the change in the form of inquiry and the more perfect enumeration at the census of 1890. The large decrease in the number of children employed also has considerable bearing on the increase in the average annual earnings." *Idem*, 3 : 10.

incomparable, it was unfortunate to make any comparison of averages. For, although it is certain that any person who attempts to use the census should examine all the explanations that accompany the figures, it is equally sure that the average popular writer or newspaper scientist will not do anything of the sort. And, as a matter of fact, eminent statisticians have compared the average wages for 1890 with the census figures for 1880, 1870, 1860, and 1850. Folio pages of census statistics that invite comparison seem to possess powers of attraction that no amount of caution and explanation can be expected to exercise.

The errors and omissions of the returns of manufactures in 1870 and previous census years are so notorious that it cannot be necessary to repeat what has already been said concerning the mistakes that must arise from the attempt to compare rates of yearly wages deduced from such materials. With the tenth and eleventh censuses, however, greater accuracy and completeness were secured, so that the incomparable character of their statistics of wages is not so easily seen. But the writer believes, nevertheless, that the attempt to compare the average wages computed for 1880 and 1890 can lead only to most erroneous and mischievous results.[1]

The first reason for considering the wage statistics of 1880 wholly incomparable with those of 1890 is that the later census was far more complete in the cities and large towns, while the earlier census was probably more complete in the country districts. Upon this point the facts have already been stated. The necessary result is that the average wages computed from the

[1] Thus Mr. J. S. Jeans, using such data, came to the conclusion that wages had advanced more during the decade from 1880 to 1890 than they had in the thirty years prior to 1880. *Fortnightly Review*, 58 : 752.

eleventh census are based upon figures that include a far larger proportion of city laborers, who receive higher money wages; while the census of 1880 probably included a larger proportion of country laborers, whose money wages are lower.

The importance of this consideration can be shown most readily by studying the average wages for the various counties of Massachusetts, as given in the state census of 1885. The figures are as follows: [1]

Plymouth county	$396.97
Suffolk "	369.13
Essex "	365.61
State of Massachusetts	*351.02*
Franklin county	348.56
Norfolk "	348.11
Worcester "	342.85
Hampden "	341.61
Middlesex "	330.77
Bristol "	324.16
Berkshire "	305.68
Hampshire "	283.38
Nantucket "	277.98
Barnstable "	238.97
Dukes "	106.79

Plymouth county, which heads the list, is only in appearance an exception to the statement that the highest wages are found in the counties having the largest proportion of urban population. In that county there is one large city, Brockton, where the average wages were $433. In the rest of the county the average was $65 less than in the city of Brockton. The same thing is noticeable in Worcester county, where the city of Worcester is the only large center of population. In this city wages averaged $382; while in the rest of the county they averaged only $324. It is evident that if one census of the state should be made far more complete for the cities than any previous census, while its

[1] Massachusetts Census of 1885, 2 : ci.

eumeration of country laborers should be less complete, there would result an apparent increase of the average wages for the state in a period when wages might actually have remained stationary.

In the Federal census of 1890 a comparison of the average earnings in the fifty principal cities with the average for the entire country[1] shows that thirty-six out of the fifty cities were credited with wages that exceeded the average for the country. Of the fourteen cities where the average wages were less than the average for the United States, many showed figures that were far above the wages for the rest of the states in which they were situated. If we select the principal class of wage-earners, males above sixteen years, and exclude officers and clerks, the results are still more striking. The writer has made such a computation for the eight largest cities, with the following results: The United States, $498; Baltimore, $503; Philadelphia, $568; St. Louis, $569; Chicago, $587; Brooklyn, $636; Boston, $654; New York, $702; San Francisco, $709. In Baltimore, where the wages show the smallest excess over the figures for the United States, it appeared that the average for the city was $226 higher than the average wages for the same class of workers in the rest of the state.

The class of employees last mentioned, viz., males above sixteen years, is the more important in this connection because it was among just such laborers that the enumeration of the eleventh census was especially complete. The census explains[2] that: "The great increase shown in statistics for industries known as 'hand trades' is largely due to the fact that no previous census has obtained so complete a report regarding such industries

[1] Eleventh Census, Manufacturing Industries, 2: xxxviii.

[2] *Idem*, 1: 2.

as masonry, carpentering, blacksmithing, cooperage, painting, plumbing, and similar trades using machinery to a limited extent." In four classes of laborers, viz., masons, painters and paperhangers, plumbers, and carpenters, the eleventh census enumerated 357,000 persons, against 97,000 enumerated in 1880.[1] This was an increase of 260,000 laborers, or 266 per cent, during a decade when the whole population of the country increased less than 25 per cent. Now these particular trades receive wages that are far above the average for the United States. Excluding officers and clerks, the average wage of the country is given as $444.83. In these four trades very few women and children are employed; and the males above sixteen years, who form nearly the entire number of workers enumerated, are credited with the following wages: plumbers, $627; masons, $628; painters and paperhangers, $644; carpenters, $648.[2] We find, therefore, that the eleventh census enumerated more than 200,000[3] workmen who were omitted from these trades in 1880. These 200,000 or more workers formed 5 or 6 per cent of all persons engaged in manufacturing occupations in 1890, excluding officers and clerks. Their wages exceeded the average wages of all classes of laborers by amounts that varied from $182, in the case of plumbers, to $203, in the case of carpenters. This one body of employees, excluded in 1880 and included in 1890, would tend to increase the average wages for all persons engaged in manufactures by ten to twelve dollars, if not more.[4]

[1] *Idem*, 1: 74, 79, 80, 81.

[2] *Idem*, 1: 23–27.

[3] This figure allows for more than fifty per cent increase in these particular trades. The employees in all manufactures increased fifty per cent from 1880 to 1890, excluding officers and clerks.

[4] Since the writer made this estimate, the official who had charge of these statistics in the eleventh census has stated that, if the trades

But there is a second reason, of still greater weight, for holding the results of the two censuses to be incomparable. There is no room for doubting that in 1890 the total wages paid were divided by a number of employees that was much smaller than it would have been if the same methods had been followed that were used in 1880. Upon this subject the census says:[1] "The questions used in 1880 tended to obtain a number of employees that would be in excess of the true average, while it is believed the questions used in 1890 have obtained, as nearly as possible, the average number." Attention has already been called to this fact. It is the more important since it had the same result as the first cause of difference between the figures of the two censuses. It tended to produce a larger average wage in 1890.

We have seen that the Massachusetts census of 1885, using as a divisor the *total* number of hands employed during the year, computed an average wage of $351.02 for the year 1885. It has also been shown that in 1886, when the publication of the annual reports on manufactures was begun, the *average* number of employees was taken as a divisor, and the average wages were thereby increased to $395.89. Precisely the same thing occurred in the Federal statistics when the eleventh census actually ascertained the average number of employees, and used this as a divisor. Further light is thrown upon this question by the Massachusetts census for 1895, which has appeared during the past year. This census ascertained the total wages paid to all employees in manufacturing industries, and divided this

that were imperfectly enumerated in 1880 should be excluded from the tables for 1890, the average wages for the United States would be $429 instead of $444. See *American Journal of Sociology*, 3 : 627.

[1] Eleventh Census, Manufacturing Industries, 1 : 14.

sum by the *average* number of hands employed. Thus an average wage of $446.41 was computed.[1] This shows a magnificent increase over the average rate of $351.02 computed in 1885; but the larger wage was secured by using a smaller divisor, and the later census makes no attempt to compare the two results. No one would claim that the wages of laborers employed in manufacturing industries in the state had increased from $351 to $446 between 1885 and 1895. In the very year in which the last state census appeared, the bureau of labor statistics published the results of an investigation into comparative rates of wages paid in 1881 and 1897.[2] This covered twenty three industries, and showed an increased average wage in fifteen cases and a decreased wage in the eight other instances. These results may justify the claim that wages in Massachusetts showed on the whole a tendency to increase during the period in question; but they demonstrate also the atrocity of the error that would be committed by any one who should compare the censuses of 1885 and 1895, and should then claim that wages had increased on the average by $95 during the decade.

There has been considerable discussion of the question whether the average number of employees, or the total number of persons employed during the year, should be selected as the divisor in determining yearly earnings. It is clear that if the total number is taken, the divisor will be swelled unduly by the transient laborers who drift from one establishment to another, and are sure to be enumerated more than once. Such a divisor would give average yearly earnings that would be too low. On

[1] Census of Massachusetts, 1895, 5: 240, 280.

[2] Twenty-Eighth Annual Report of the Bureau of Statistics of Labor, 1–42.

the other hand, when we select the average number employed, we use as a divisor the average number of positions filled throughout the year. This gives average yearly earnings that represent what the individual laborers would receive if employment were continuous throughout the year. Average wages computed in this manner are more than the actual income of individual laborers, especially in trades where employment is irregular. It does not fall within the scope of this article to consider whether the census ought to inquire for the average number of employees, or for the total number. The statistics of manufactures are not designed primarily to furnish statistics of annual average wages. This particular question should be framed in such a manner as will be most useful for the primary purposes for which the investigation into manufactures is conducted. But we must insist that wage statistics computed with one kind of divisor must not be compared with data secured by the use of a different divisor.

Some of the criticisms that have been directed against the wage statistics of the eleventh census can be accounted for by remembering that the rates of annual wages given there represent, not the actual earnings of all persons employed, but the amounts paid annually to the occupants of a certain number of positions. Thus the average wages of carpenters in New York city are computed at $896. This would mean $3 per day for nearly 300 days of employment. A critic who has exceptional facilities for securing information concerning actual conditions in that city, writes: "The average wages of good, steady, thoroughly competent carpenters never exceeded $650 for the entire year."

Some of the results of comparing the average wages given in the two censuses are so ridiculous as to show

the absolute incomparability of the two sets of data. Thus the same critic points out that, according to the census data, carpenters' wages in New York City increased from $640 in 1880 to $896 in 1890. For the city of Poughkeepsie we are asked to believe that carpenters' wages advanced from $357 in 1880 to $729 in 1890. These results are so absurd as to show that we are dealing with data that are either totally erroneous or else collected by such different methods as to be wholly incapable of bearing comparison.

It remains to be consider what the twelfth census should attempt to accomplish in this field of wage statistics. The writer will assume that the purpose of such statistics should be to investigate the conditions under which the large masses of our population who are dependent upon the receipt of wages are actually living. In the present condition of statistical science we can not hope that such investigation will throw much light upon what is technically called the problem of share distribution. Moreover, since the census can not well undertake to collect comprehensive statistics concerning the prices of commodities, it must confine itself to the question of money wages.

At the outset the question may fairly arise whether, in view of the establishment of the Department of Labor at Washington, the Federal census should continue to gather statistics of wages. This bureau was created for the purpose of investigating labor problems. It has already published much information relating to wages; and is, at the present time, preparing a report upon wages paid in the leading countries of the world.[1]

If a permanent census bureau should be established and

[1] Am. Stat. Ass'n *Publications*, 5 : 373; Eleventh Annual Report of the Commissioner of Labor, 5.

should undertake the systematic collection of wage statistics, it would appear to be duplicating the work of the Department of Labor. If, on the other hand, the Census Office should remain a temporary affair, we may fairly doubt whether this particular field of investigation could not be covered more satisfactorily by the Department of Labor with its permanent organization. There is reason for thinking that even the special agents appointed by the census to collect statistics of manufactures do not always have the time or training for the work of gathering accurate data concerning wages. It seems probable that better results could be secured by placing additional funds at the disposal of the permanent labor bureau. Such an investigation might not cover as much ground as the census, but the improved quality of the materials might well counterbalance the greater quantity of the census returns. This would be especially true of that portion of the census statistics that may have to be left in the hands of the ordinary enumerator.

One other point is worthy of consideration. The census returns necessarily cover but single years at intervals of a decade. The periods when the census materials are gathered may happen to be abnormal, so that by this fact alone any comparison of results from one decade to another may be vitiated. Then, too, important fluctuations may take place within each decade, and upon these the census can give no information. Such considerations induced Massachusetts to provide for annual statistics of manufactures. Finally, the publication of census returns seems to be necessarily such a slow process that no inconsiderable advantage might result from the prompter methods of the Department of Labor.

Assuming, however, that the census, in its inves-

tigations concerning manufactures, is to continue to gather data concerning wages, we may consider what should be attempted. In doing this, we should remember that the principal purpose of the census investigations is to gather information concerning manufactures. The questions relating to total wages and employees should, therefore, be framed with this primary object in view.

For this last reason, the census should continue to investigate the total wages paid, as an important element in the expenses of manufacturing industry. But it may be doubted whether the data thus gathered should be used for the purpose of computing average yearly earnings of laborers. In any event, the utterly incomparable character of the statistics of the eleventh and preceding censuses should be set forth so clearly as to offer no possible excuse for the further misuse of their figures.

If the computation of the average yearly earnings is continued, the twelfth census should carry on the work, commenced by the eleventh, of ascertaining the average earnings of workers in each occupation, separating in all cases men, women, and children. Such data could be used for some purposes, since the averages thus computed would be based upon units of some degree of homogeneity. The results would be further improved if they could be more fully classified by sections of the country. Furthermore, a separate table might be prepared, from which the notoriously incorrect materials gathered by the ordinary enumerators outside of the cities and towns could be excluded. This was accomplished in the eleventh census in the separate volume devoted to the principal industrial centers. For all these purposes it would matter less whether the divisor

should be the *average* number of employees or the *total* number, provided that future censuses should adopt a uniform method of procedure.

It has been suggested that wage statistics should investigate only the earnings of laborers steadily employed in each establishment, because other workers are largely migratory or incapable.[1] It is urged that we should endeavor to ascertain primarily the earnings of capable laborers who are steadily employed during the months that each establishment is in operation. The importance of studying the numbers and condition of transient employees is not denied, but it is considered best to make this the object of an independent investigation. This point seems to be well taken, provided that it is feasible to separate the two classes of laborers. But it may be impossible to introduce such a feature into the investigation concerning manufactures, and an independent inquiry might be needed in order to accomplish such a result.

The writer has already expressed the belief that the most valuable wage statistics contained in the eleventh census are to be found in the tables of classified weekly rates. The advantage of such a method is that it deals largely with actual facts, and does not employ averages that may be unreal and misleading. Such statistics, when properly tabulated, enable the student to ascertain exactly what rates of remuneration the great mass of the laborers is receiving.

Besides tabulating such returns so as to show, for each class of laborers, the numbers employed at each rate, and the per cent which such numbers bear to the total number of persons in each group, the results might

[1] See Mayo-Smith, in *Quarterly Journal of Economics*, 2 : 397, f.; Von Meyr, in *Allgemeines statistisches Archiv*, 2 : 135.

be presented graphically according to the method suggested by Dr. Venn.[1] This consists in drawing a base line that shall represent the different rates of wages, and then constructing ordinates denoting the relative numbers of laborers receiving such specified rate. This plan would make it possible to plot a curve that would represent accurately the condition of the wage earners at a given time. Between different periods, changes in the shape of the curve would indicate the course of weekly rates of wages.

Tables of weekly wages need to be supplemented by statistics showing the number of weeks of full working time the operatives are able to secure in the course of the year. Such inquiries fall easily within the scope of the census of manufactures. With their use, the tables of weekly rates would furnish most valuable information concerning the course of wages in manufacturing industries.

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[1] *Journal of Royal Statistical Society*, 64 : 445.

WEALTH, DEBT AND TAXATION.

Valuation and Taxation.

The report of the census of 1890 on Wealth, Debt and Taxation consists of two parts: Part I—Public Debt; Part II—Valuation and Taxation. This review covers the second part.

General Introduction.—As the heading—Valuation and Taxation—implies, there are two distinct purposes served by this part of the census. One purpose is to obtain a general inventory of the wealth of the nation; the other is to ascertain the sources and amounts of the income of the commonwealth and local governments,[1] and to show the character of the charges upon that income.

Prior to 1880, there was no distinct recognition in the census investigations of the second purpose. Attempts were made in 1850, in 1860 and in 1870 to estimate the amount of wealth in the country, and in that connection the assessment of property for purposes of taxation was ascertained. In 1880 an investigation into taxation was added to that into the assessed valuation of property and the second of the two purposes was for the first time clearly recognized.

Although these two purposes are entirely distinct in character, yet their original combination and the somewhat subordinate, contributory position which the investigation into taxation occupied at the beginning led to complications to which certain serious faults in the eleventh census (1890) can be traced. This unfortu-

[1] States and territories, including the District of Columbia, and all political subdivisions or parts thereof, which raise or expend public revenues.

nate combination arose very naturally. A large proportion of the revenues of the state and local governments was, and still is, raised by the taxation of property, and it is still the common assumption that all property is taxable and is, or should be, assessed. This assumption, which is not at all warranted by the facts, was made in the seventh census and again in the eighth census.[1] It was but slightly modified in the ninth census and did not altogether disappear in the tenth or eleventh. In the first two reports, both of which aimed to find the amount of our national wealth, the assessed value of property taxed was ascertained and to that certain amounts were added to make the "true value." Property exempt or which escaped taxation was not considered until the ninth census. At that time there was added to the estimated "true value" of property taxed a certain sum supposed to cover the value of property exempt from taxation or which escaped by fraudulent evasion. In 1880 and in 1890 the attempt was made to make a complete inventory of national wealth, and in this connection the assessed valuation of property taxed was used as a guide in obtaining the value of certain kinds of property. At the same time the investigation concerning assessment and taxation was greatly developed in scope and accuracy. Each of these two parts of the investigation having thus had its development, it is easy to see that they have really separated. Still the traditions of the old combination cling to the investigation, affecting its terminology, its methods, the presentation of its results, and the comparisons drawn from it, and give to it many features the presence of which cannot be explained except as historical accidents. Thus,

[1] Special report of the superintendent of the seventh census, Dec. 1, 1852. Eighth Census, Miscellaneous Statistics, 294.

the terms, "assessed valuation" and "true valuation," formerly represented two ways of looking at the same thing, namely, the property taxed. But, though the term "true valuation" is still used, it applies in the eleventh census to all kinds of property, taxed and untaxed. Yet in spite of that change the new "true valuation" is freely compared with the old as if both referred to the same thing. Thus we are told, for example, that the total wealth of the country in 1890 was $65,000,000,000, or $1,036 per capita. This is then compared with $7,000,000,000, or $308 per capita in 1850. But the $7,000,000,000 represents the corrected value of property taxed, while the $65,000,000,000, ostensibly at least, includes all property, taxed and untaxed, alike. The comparison is then elaborated and extended, percentages of increase, etc., being offered.

Other comparisons, which were perfectly logical when first instituted, have become illogical and inadmissible through the changes which have been made, but are yet continued. Of these the following will serve as an example. In 1860 we were told that the "assessed valuation" of property taxed was $12,000,000,000 its "true valuation" being $16,000,000,000, a perfectly proper comparison. But in 1890, we were told that the "assessed valuation" of the property taxed is $25,000,000,000, and that the "true valuation" of this property together with a large amount of other kinds of property was $65,000,000,000, and further that the "assessed valuation" is 40 per cent of the "true valuation." The most natural inference is that the assessors had decreased their assessments from 75 per cent to 40 per cent in 30 years, an inference which is not at all near the truth.

It is time that the two purposes of this part of the in-

vestigation should be recognized as entirely distinct. Old and no longer admissible comparisons should be discontinued and the foundation laid for new and permanent comparisons, which may be continued in the future with ever increasing value. It may be said in defense of the census of 1890, against the criticisms just offered that the reader is warned against the error of such comparisons by the preliminary explanatory statements. This is quite true, and the warning is good as far as it goes. But in the presentation of the results of a public statistical investigation two things must be borne in mind. (1) Many unscientific persons will necessarily take the tables verbatim; and will use them "uninterpreted" and unmodified by any explanatory statements; and hence, no table or statement should be printed which taken in that naïve, simple way will lead to serious error. To drop the old comparisons, altogether, is, therefore, better than to continue them in such a misleading form. (2) Scientific investigators, who use the census, will need to "interpret" the figures given, in order to make new combinations, and for them the most ample and detailed explanations of methods and significance are indispensable. Indeed one of the most troublesome features of the volume on Valuation and Taxation now under discussion is the inadequacy and obscurity of the statements given regarding the methods by which the figures were obtained and their real meaning. Many instances in which the census of 1890 failed in this respect will be found in the following attempt to analyze the figures given.

I. THE WEALTH OF THE NATION.

The purpose of this part of the investigation is quite clearly indicated when we call it our national inventory.

The information sought is the value of all the different kinds of tangible wealth within our boundaries at the close of the census period, 1890.[1] Of necessity the larger part of this investigation must be made by what the statistician would call an enquête, that is, a careful expert estimate. Enumeration is possible only in a few of the items.

At this point the question might be raised whether such estimates of wealth in general are of any scientific use. The trained statistician naturally looks with considerable suspicion upon an aggregate composed of so many complex elements, each measured by a different plan and on a different scale. He will be extremely wary of drawing any conclusions from it without a careful study of the methods by which the figures were obtained and considerable readjustment of the statements. But the layman frequently accepts the census estimate of wealth, and especially that conglomerate total, as an accurate measure of national prosperity, and draws conclusions of varying accuracy. This review is not the place for an extended discussion of the "relations between private property and public welfare."[2] It is sufficient to recall the fact, so often dwelt upon by economists, that national well-being or prosperity depends upon a great many other things than the accumulated possessions of the people. It depends quite as much upon many of the "free gifts of nature" as upon those things to which we ascribe a value. It depends

[1] The phrase "at the close of the census period, 1890," appears to mean May 31, 1890. No more definite statement of the date to which the investigation refers is given in connection with the estimate of wealth. There is some internal evidence that all parts of the estimate were not scrupulously reduced to that date. Since, however, the entire inventory is at best an approximate estimate, it would, perhaps, be over-critical to insist on the reduction of all parts to the same date.

[2] A. T. Hadley, Economics, Subtitle.

very much upon the abundance and consequent cheapness of things, and upon the uses to which our accumulated possessions are put. At times, national well-being increases with the increase of circumstances which tend to lower the value we put upon accumulated possessions. An increase in the number of dollars' worth of goods on hand, or in the number of dollars' worth of land, unaccompanied by a material increase in the amount of goods or the area of land under cultivation is frequently a sign of the increasing hardship of economic life. "Public wealth," says Hadley, "is a flow, not a fund; it is to be measured as income, not as capital." It must, therefore, be clear that the census estimate of wealth cannot give us an accurate measure of national well-being.

Yet the inventory has its use, even if it does not measure the "Wealth of the Nation" in the broadest sense of that phrase. The grand total may be a meaningless conglomerate, but the items in the list have each a definite significance. Indeed, the national inventory has about the same use which a merchant's annual inventory has. Although the total amount of stock on hand has no significance as to the profitableness of the business, and although the merchant reckons his success by the size of his profit, not by the size of his stock, yet he wants to know the relative amount of each kind of goods, the adequacy of the supply as related to the possible demand, the proportion of dead stock, etc., etc. So the economist is interested to know the relative amount of each of the different kinds of wealth. From this point of view the investigation has its importance and there can be no question of the wisdom of continuing this part of the census.

If this view of the scientific purpose of the inventory of wealth be correct, it has certain consequences which

are important in their bearing upon the method of the investigation and upon the presentation of the results. These consequences, briefly stated, are (1) that a correct classification is very important; (2) that each item must be estimated in a way to show its relations to the others; (3) that the results must be so presented that the reader can understand the real significance of each class of wealth.

In taking up the census estimate of wealth the first thing we are interested in, therefore, is the classification used. This was determined in 1890, mainly by the exigencies of collecting the data, which, in turn, were determined by the desire to utilize the results of other investigations throwing light on the subject. The information obtained from these other investigations was not systematized and rearranged according to some logical classification or plan, but carried over bodily, as it were, and the parts roughly patched together. The other investigations made use of were:

1. The census investigation into manufactures, especially that part of it dealing with the capital invested, the value of machinery in mills, and of the product on hand.

2. The census investigation into transportation by land and water, especially that part concerned with the value of railroads and shipping.

3. The census report on mineral industries from which the value of mines and quarries with product on hand was taken.

4. Much valuable assistance might have been obtained from the census investigation into farms, homes, and mortgages, and apparently some was so obtained. Indeed if the investigation into "Wealth" had been combined with that one, many of the items which were

merely "estimated" could have been enumerated and additional details obtained. But it will be remembered that the investigation into farms, homes, and mortgages was ordered after the regular work had been planned, and when it was too late to take advantage of the opportunity thus afforded.

Other government reports and investigations were of assistance, especially the report of the Director of the Mint for 1890, which gave the value of gold and silver coin and bullion.

The rest of the data seem to have been collected or estimated, especially for this report. The general classification is as follows.

1. Real estate, with improvements thereon	39,544,544,333
2. Live stock on farms, farm implements, and machinery	2,703,015,040
3. Mines and quarries, including product on hand	1,291,291,579
4. Gold and silver coin and bullion	1,158,774,948
5. Machinery of mills and product on hand, raw and manufactured	3,058,593,441
6. Railroads and equipment including $389,357,289 for street railroads	8,685,407,323
7. Telegraphs, telephones, shipping, canals, and equipment	701,755,712
8. Miscellaneous	7,893,708,821
Total	$65,037,091,197

Is this classification sufficient? Do these items include all the wealth of the country? These questions are rather difficult to answer. So entirely have the exigencies of collection been allowed to rule the classification that it appears totally irregular and illogical. It is almost impossible to say whether all kinds of wealth have been included or not, still less is it possible to say exactly where certain kinds of property belong if they are included. The critical reader is not particularly reassured by the confident statement of the Census

Office that "these items include substantially all the wealth of the country." A few rather important instances have been noted which seem to throw a doubt on the accuracy of this statement. Thus, for example, no special mention is made of electric light and power plants, nor of gas plants in private hands or belonging to corporations. An examination of the details shows that probably some of the real estate of such corporations is included under the head of real estate. This is true of all those states where the corporations are taxed on their property. The machinery of such companies is probably included in the machinery of mills, but the poles, lines, cables, pipes, etc., so far as I could ascertain, are not included anywhere. There is no evidence that more than a very small part of the property of water companies, both those supplying water for household uses and for power and those supplying water for irrigation, is included. Possibly because the investigation is confined to the tangible wealth of the country, the franchises of such corporations are not included, although it is hard to see how the real wealth or earning power of these and other similar corporations, or even the value of their property, can be properly estimated without reference to the value of their franchises. Any statement of wealth which omits such important elements as the valuable rights, privileges and relations characteristic of modern industrial organization cannot be said to contain "substantially all the wealth of the country." Merchandise held in stock by merchants and producers was estimated by the tenth census at over $6,000,000,000. This item in the eleventh census is included under "miscellaneous" and given some small value which is not stated. No explanation of the change is offered.

It appears from the report that public lands, public buildings, and the personal property of governments were included in the total wealth. But the exact amount of these items is not clearly stated. If these items are to be included, one might inquire why public highways, roads, streets, bridges and the like were not included. Are they not a part of our tangible wealth? They do not appear to have been included in the list. In reference to such items as these it may be said that it is difficult to tell where to draw the line. If we include streets and roads, we should include canals; if canals, then harbors and rivers, upon which the government spends so much money. If we include these items it would seem reasonable to include a breakwater; if a breakwater, why not the shore which it shelters? It is obvious that this leads to a serious difficulty. It is probable that the only way out is to draw an arbitrary line, and to include only such items of public wealth as have been the objects of the expenditure of public funds, or been held for sale. Of the former class the public works will serve as an example, of the latter the public lands. These items have, of course, no market value and the sum at which they are to be entered in the list will be more or less arbitrary. Still it is not difficult to estimate in most cases what they would be worth if they were private property, and it would be eminently satisfactory for all purposes to enter them in the list at such a valuation.

It would serve no useful purpose to allow the criticism of the eleventh census in this particular to turn upon the claims of any or all the above items to be recognized by a place in the list of wealth. They are not cited for that purpose, and there may be others that are not mentioned, which are of more importance and better entitled to a place. All that it is necessary to point out is that

is is impossible from the results presented to tell whether the above items or any part of them have been included or not. Even if the census is not open to the charge of having omitted them, it is certainly a fault not to have explained where they are to be found, or if they have been omitted the grounds for their exclusion. The general classification is unsatisfactory even if it is not, as indeed it appears to be, incomplete.

We pass next to the methods pursued in ascertaining the amount of the different items. "The term real estate includes all lands and lots with improvements thereon, but does not include mines, quarries, telegraphs, telephones, or railroads, except that in a few states where the roadbed, station houses, and repair shops of railroads are classed as real estate for purposes of taxation and their value not separately reported."[1] To some extent therefore the items are duplicated. It is a matter for careful consideration whether this cannot be avoided or the error reduced.

The value of the real estate was ascertained by inquiry from the persons empowered to assess it for taxation, checked by "more than 25,000 inquiries sent throughout the country to persons believed to be familiar with the values of real estate, asking their opinions as to the relation between the assessed and true value in their respective localities."[2] This method does not seem to have been applied uniformly to all parts of the country. The 25,000 inquiries were sent out upon some very peculiar plan. If that were not the case, it is very remarkable, to say the least, that the true value ascertained in this way should correspond exactly to the assessed value in the case of real estate in Maine and in the District of

[1] Eleventh Census, Wealth Debt and Taxation, 2:7.

[2] *Ibid.*

Columbia. If there are two parts of the country where the assessed value is the same as the market value, it is worth the whole cost of the census to have established the fact. In Wisconsin and Pennsylvania local reports were partly utilized.[1] The results obtained in this way were then submitted to the governors of the respective states. This procedure, as might have been foreseen, resulted in eliciting no new information.

The most commendable feature about the above method is its economy. No other method could have been used without a material increase in expense. It is an attempt to do by correspondence what could be done much more satisfactorily by the special agent. A much greater degree of success might have been assured if it had been applied in a somewhat different way. A great deal depends upon the persons selected to whom the inquiries are sent. But even more depends upon the way in which the questions are presented. The persons to whom the inquiries are sent should be those who are familiar with actual sales. The questions should call for an actual list of the sale prices compared with the assessed values of pieces of land that have actually changed hands within some short period preceding the census period. The question asked in the census of 1890, "What is your estimate of the ratio or percentage which the assessed value of real estate in your town bears to its true value, viz., to the amount which it would bring at sale in open market?",[2] when unaccom-

[1] Although the true values ascertained by the Pennsylvania Tax Conference were adopted in the main yet in the case of Philadelphia the census figures vary from those of the Conference by more than $125,000,000. No explanation of this is offered, and from the text the reader is left to suppose that the figures of the Conference were simply reprinted.

[2] Circular letter of January 20, 1890. Form 7-466.

panied by a call for a statement of the facts in regard to actual sales, is but a license for guess work.

The lists of actual sales obtained in this way should then be checked by statements obtained from the courts of the valuations made by appraisers appointed to determine the value of the estates of deceased persons. For the same purpose it would be possible to use the mortgages executed within the last two years preceding the census period. From these the value could be roughly estimated by assuming that the property was mortgaged for a certain proportion of its value. If in addition to these sources of information a special agent could visit the different localities, talking with owners, real estate agents and other persons, it would be possible to arrive very closely at the true value. None of these sources of information seems to have been utilized.[1]

The sources of possible error to be guarded against are: 1st, mistakes in the judgments and statements of the persons to whom the inquiries are sent; 2nd, the omission of lands from the assessment; 3rd, differences in the definition of real estate in the different state laws. The first source is one which involves the whole theory of statistical observation and cannot be enlarged upon here.

The second error is, I am convinced, a very large one. In very few of the states are there any good and com-

[1] It has been found impossible at this late date to obtain a complete set of the schedules, etc., used in compiling these statistics. Through the kindness of Mr. King, census clerk in the Department of the Interior, as complete a set as possible was sent to me. The judgments above expressed were first formed by a study of the returns in the census, and were afterwards confirmed by an examination of blanks numbered 7–466 and 7–467. It is, however, due the Census Office that I should quote from Mr. King's letter: "Please bear in mind that it is not complete, (*i. e.*, the set of blanks) and can only be used as indicating something of the scope and manner of the inquiry: any specific subject which might be criticized from these papers might have been exactly covered by some one of those that are missing."

plete maps for the use of the assessors, and it is rare that the assessment is carefully checked by the use of maps. The assumption that all real estate is assessed is far from the truth.[1] My attention has frequently been called by assessors to the fact that they have discovered and assessed lands which had been overlooked by their predecessors. In a single county in California lands, now assessed at over $500,000, but which for years had escaped taxation, were recently discovered by the assessor. In addition to such items there is in many parts of the country, even in New England, and especially on the Pacific Coast, a considerable amount of land, known in the West as "Sobrante," that is irregularly shaped pieces of land between grants, townships and sections, not covered by the descriptions in the surveys. The correction of this error is far beyond the power of the Census Office. It will have to await the completion of more adequate surveys.

The third source of error, namely the differences in the definitions of real estate for assessment purposes, is most complex and difficult to deal with. It can, however, be avoided by a careful comparison of the laws of the different states and by reductions and readjustments according to some uniform plan. The Census Office itself should draw up a simple and clear definition of real estate and follow that uniformly, changing the local definitions to conform thereto. The principal difficulty here, namely, the classification of possessory claims as personal property, will be discussed below in connection with taxation.[2]

[1] Even the total area of the country is not definitely known. Compare in this connection the very interesting discussion of the Area of the United States by W. F. Willcox. Am. Econ. Assn. *Studies* 2 : 211–228.

[2] See pp. 400,ff.

The conclusion is that the method used by the eleventh census to obtain the value of real estate was defective in several particulars. It depended too much upon opinion, and many facts which would have aided in making the estimate were not collected. If for reasons of economy it is found impossible to employ special agents to ascertain the value of real estate, a far more satisfactory result could have been obtained by the method suggested above.

"No attempt has been made to ascertain the value of improvements separate from that of lands, or of city or town lots separate from other lands measured by acres, as the state reports do not generally make such divisions, and original investigations as to land values have not been instituted by this office."[1]

The idea here expressed, that since it is not always feasible to ascertain the assessed value of improvements separately, it is not worth while to ascertain the true value of improvements apart from the land, is an inheritance from the time when the two purposes of the investigation above stated were combined. There are many items in the above list, the separate assessed value of which could not be learned, and these were nevertheless wisely segregated. Moreover, it would be possible in most parts of the country to ascertain the value of improvements separately. The investigation into farms and homes could easily have been extended so as to show the relative value of town lots as compared with lands measured by the acre. In many states, building contracts are a matter of record and with these it is possible to ascertain the value of improvements especially in cities.[2] It would be extremely useful to know this item separately.

[1] Eleventh Census, Wealth, Debt, and Taxation, 2: 7.

[2] For application of this method see Illinois Bureau of Labor Sta-

"The value of mines and quarries, including product on hand, is the capital invested in these enterprises, as shown by the Report on Mineral Industries for the Eleventh Census. It does not represent the amount of capital stock issued, but is the actual investment in the land, buildings, fixtures, tools, implements, live stock machinery, etc., including in some cases a small amount of cash on hand, which was not reported separately and could not therefore be eliminated. The commercial value of the mines varies from day to day, but it is thought, as only mines are included which appear to be yielding more or less product, that their average commercial value would be at least the amount of capital actually invested therein. The lands and buildings belonging to mines in some states are assessed as real estate, and to that extent their value may be also included in that of real estate, as herein reported, but at most the amount is not relatively great. In case the tax is levied on the product, as in several states, the real estate and improvements are not assessed for taxation, and consequently would not be embraced in any real estate values herein published."[1]

There is much to be said in criticism of this method. It is admittedly a guess and a bad one at that. The value of a mine depends solely upon the present output and the expectation in regard to the life of the mine, so far as these facts are known. It has no necessary connection with the amount of capital already expended in roads, lands, buildings, machinery, shafts, tunnels, etc. The expectation in regard to the richness and

tistics, Eighth Biennial Report, (1894). Also on a smaller scale, Plehn, General Property Tax in California, Am. Econ. Assn., *Studies* 4 : 197, Appendix D.

[1] Eleventh Census, Wealth, Debt, and Taxation, 2: 8.

size of the body of ore may prove to be mistaken, but the "true value" is the commercial value to-day. For the purpose of the census no other value is admissible. Fluctuating as the commercial value may be, owing to the uncertainties of mining, it is yet the best that human agencies have been able to devise. It is the value measured as accurately as men of experience and training in such matters can measure it. The commercial value of a mine varies from day to day. So does the population of the country. But that fact does not preclude the possibility of ascertaining what it is to-day. This mistake is due to a forgetfulness of one of the elementary principles of all statistical science: "Every statistical investigation requires a limit of the time and of the space in which it is to be made." A mine or a quarry had a certain definite value June 1, 1890, which could be ascertained. The fact that it might have a different value July 1 has no bearing on the problem before us.

The same criticism bears with equal force upon the estimate of the value of railroads, which was set down at the cost of construction. The value of a railroad, June 1, 1890, can be ascertained in most cases to a cent by adding together the market value of the stocks, bonds, and other securities by which various titles to the road are transferred. The problem which the census had to solve was not that troublesome one, with which the courts are frequently vexed and over which railroad commissioners worry, namely: what shall be the capitalization upon which the government or the courts may allow a railroad to earn interest? It is not what ought to be the valuation but what is the present value?

The suggestion that the "true value" might be ascertained by capitalizing the net earnings at 5 per cent, a method which is actually applied by the census to telegraphs and telephones, canals, etc., is equally arbitrary. The value of any property is determined by a number of complex considerations affecting different items of property differently. Among the most prominent of these considerations are (1) present earnings, (2) security, (3) estimated future earnings, (4) general repute. Property belonging to corporations is especially affected by such considerations, but the present value,—the result of all such causes,—is definite and easily ascertained. If a given railroad had 10,000 shares selling June 1, 1890, in the market at $95 each, and 2,000 bonds selling the same day at $1,050 each, with no other outstanding securities, that road was worth $3,050,000. That sum represented the careful judgment of men experienced in estimating such values; a judgment made with a knowledge of all the circumstances which on that day could affect in any way the value of the property. Even supposing that the value were temporarily depressed by a false rumor, that sum and no other was the actual value of the road. The census can recognize no other. The method of capitalizing the net earnings at a certain per cent, or of finding the cost of construction, is applicable, if at all, only to property that seldom changes hands, and where the market value is not determined. It is certainly not applicable to railroad property and the like, except in very rare instances.

"Of the miscellaneous, the value of furniture and personal belongings constitutes a large portion. To arrive at the value of such property an examination was made of more than 8,000 insurance policies on contents of houses not located in large cities, and the result

showed the average value of furniture insured in such houses to be $387. The value of private carriages and tools of mechanics is not known, but it is believed that for each house in the United States there would be of furniture, tools and carriages an average amount of $400, making for the entire country a value of about $5,000,000,000."[1]

This method ought to be fairly adequate; if combined with, and checked by, that used by the tenth census, it certainly would be sufficient. That method is described as follows: "The number of families in each state was taken, and these were distributed, according to the statistics of occupation, into certain characteristic classes. The average value of the household goods, in the families of each class, was then estimated as thoughtfully as possible, item by item, the values given to the goods representing what they were worth to the owner, or what it would cost to replace them, with fair allowance for wear and tear, *not* what they would be worth to sell as second-hand goods. These results, secondly, were checked by an independent computation in which the annual product, or importation of each class of household goods, furniture, clothing, watches and jewelry, pianos and sewing-machines, etc., was taken into account, and an average 'life' in use assigned to the goods of each class. The result of this second and wholly independent computation was to afford a somewhat striking corroboration of the conclusions reached by the first method. Allowance was then made on account of the average quantity of food, fuel, and other supplies on hand for domestic use, yielding the aggregate of five thousand million dollars given to the table."[2]

[1] Eleventh Census, Wealth, Debt and Taxation, 2:8.
[2] Tenth Census, 7: 11 and 12.

It is not clear that the item "miscellaneous" covers exactly the same things in the tenth census as in the eleventh, and the fact that no increase was found is perhaps not significant. But here we have again an example of one of the worst faults of this investigation. We are not given sufficient explanation of the real significance of the figures to enable us to interpret them. In making the estimate certain definite items must have been counted. It should be stated exactly what they were, instead of concealing them under the term "miscellaneous."

Among the miscellaneous is also "included the value of public libraries and of personal property owned by the national, state, and local governments exempt from taxation, returns of which have been received at this office from every county and nearly every municipality in the country."[1] The division of some of the items between the different states is necessarily arbitrary and no criticism can justly be made of the methods used by the eleventh census in this respect.

To sum up, we have found: (1) that no logical classification of the items of wealth to be estimated was used; (2) that there are probably omissions of considerable importance; (3) that it will probably be found feasible to obtain better information concerning important subdivisions of some of the classes, for example land values; (4) that under real estate, "improvements" might be separated from land, farm lands from town lots; (5) that in only three of the eight items, (the second, fourth and fifth), including a little over 10 per cent of the total value obtained, were the methods used fairly satisfactory; (6) that in the other items, covering nearly 90 per cent of the total value reported, the methods used

[1]Eleventh Census. Wealth, Debt, and Taxation, 2 : 8.

were faulty and the results doubtful. This is especially the case with mines and quarries, railroads, telegraphs and telephones; (7) that in few cases are we given sufficient explanation to enable us to interpret the figures satisfactorily.

It has already been noted in the introductory part of this review that the estimate of the total wealth of the country in 1890 was upon an entirely different basis from that used in any previous census with the possible exception of that of 1880, and that comparisons could not, therefore, properly be instituted between the different census reports to show the increase or decrease of wealth from decade to decade. Nevertheless such comparisons were made and carried out at length. This constitutes a most serious and mischievous error.

In answer to similar criticisms upon a preliminary publication by the Census Office of such comparisons the reply was made, "that at this day any correction of the figures of true valuation for any previous census period is utterly impossible, however desirable such correction may be, the necessary information for the purpose not being procurable."[1]

The methods pursued by each census were then reviewed, and in conclusion the following warning was given:

"In comparing the report of true valuation of 1890 with like valuations of previous periods it should be borne in mind:

"First. That no statement of true valuation previous to 1890 included the value of vacant state or national land or Indian reservations.

"Second. That the true valuation for 1870 admittedly embraces certain duplications of value of personal prop-

[1]Eleventh Census. Wealth, Debt, and Taxation, 2; 9.

erty, arising from the taxation of mortgages and the realty represented by them, and that the values are inflated, owing to the depreciation of the standard then in use, requiring a corrective reduction of 20 per cent.

"Third. That for 1860 and 1850 the true valuation appears to have been made by adding to the assessor's list such an amount as would, in the opinion of the officer reporting, compensate for the undervaluations of the assessor. If such course was pursued, no property exempt from taxation or which escaped the assessor's list is included as a part of the property valued.

"These admitted differences of method pursued in reaching the figures of true valuation for the several census periods, and the temporary character of the Census Office, of themselves preclude any attempt of one census to revise the figures of a previous one; and the figures as published, if not as accurate as desired, can be accepted with safety as showing in a general way a continuous increase in the wealth of the nation, the exact proportions of which cannot be measured."[1]

It would seem that this answer to the objections is not entirely relevant, and the warnings against comparisons have practically little value in preventing false conclusions from being drawn when the census report itself carries out these inadmissible comparisons in detail.[2] It is a grand thing to have the scope of our census inquiries enlarged with each succeeding decade, but the unmodified results of enlarged investigations should not be compared with those of older and narrower investigations. In this respect the form of the report in

[1] Eleventh Census. Wealth, Debt, and Taxation, 2 : 10 and 11.

[2] *Ibid*, Table 3, p. 14, summarised in table on p. 9. See on the same subject an article by H. L. Bliss, *Journal of Political Economy*, 4 : 86–93 (1895–96), where a similar criticism is advanced. The appendix to this review (pp. 411,ff.), contains a list of inadmissible comparisons.

the tenth census[1] is somewhat better. There the valuations for 1850, 1860, and 1870 are republished, with explanations of their significance, but no direct tabular comparisons are made.

Although the census of 1880 undertook to ascertain all the wealth of the country, its methods and consequently its results were different from those of the eleventh census, so that it is not wise to use these two, even, for anything save the roughest comparisons.

It is perfectly clear that the errors of the eleventh census as pointed out above make it undesirable to perpetuate its methods. Thus it remains for the twelfth census to make a fresh start and to establish a permanent and perfectly satisfactory method for ascertaining and measuring the wealth of the country. If such a method is established and continued, we shall, perhaps, in the future be able to measure our progress in material well-being.

Perhaps it is not possible to outline in all its details the method which should be adopted, but the general outlines of what should be aimed at are not difficult to state. First the exact date to which the census estimate refers should be carefully determined and, as far as possible, all valuations should be reduced so as to apply to that date. All exceptions should be clearly stated. The space limit is also to be determined. Wealth within our national boundaries alone should be included. The items of wealth should be treated as far as possible objectively. Credit instruments representing claims upon property already counted should be omitted, but all other credit instruments, such as foreign government bonds, stocks and bonds of foreign corporations, etc., might, perhaps, be properly included, if ascertain-

[1] Tenth Census, 7 : 1–15.

able. Our own government bonds, etc., may well be omitted, although in a certain sense they represent an increase of present wealth at the expense of the future. But as they form a part of another investigation, any one desiring the total present wealth of the country can make the addition for himself. Credit currency can also be safely omitted. Then a general, hypothetical, working classification should be determined according to strict logical principles and along the broadest possible lines. It may not, at first, be possible to obtain figures for all the sub-divisions which seem desirable, but it is well to indicate them. The classifications used in 1880 and 1890 were mere haphazard arrangements. It is impossible from them to tell whether all kinds of wealth are included and where any given item belongs.

The task of forming a comprehensive and elastic classification is not particularly difficult. We have, traditionally, two great classes of wealth, real estate and personal property. Every item of wealth in the world fits easily under one or the other of these.[1] Then there are three ways in which any one item in these two (or three) kinds of property may be owned. (1) It may belong to the public, that is, belong to some branch of the government or be held in trust for the public benefit.[2] (2) It may belong to a quasi-public corporation or a public service corporation. (3) It may belong to a private individual. There are no other conceivable

[1] A possible exception is water craft, steam and sailing vessels, of which we might if deemed necessary make a third class, but there can be no serious objection to including them under personal property.

[2] The test here should be whether it is legally possible for the corporation or persons holding the property in trust to alienate it or so dispose of it that a public purpose is no longer served thereby. It would include in most instances the endowment of educational and benevolent institutions. Church property, however, is generally purely private property and would seldom be included.

ways in which property can be owned than these. It is then a very simple task to outline the proper, natural, and logical classification of wealth for a national inventory.

The following rough outline of such a classification is presented by way of illustration. The details included are not intended to be complete, but rather as suggestive and explanatory.

I. Real Estate;
  A. Public:
    1. Lands:
      a. National,
      b. Commonwealth,
      c. Local,
      d. Educational and benevolent trusts.
    2. Structures and improvements of all kinds:
      a. National:
        (1.) For defense,
        (2.) For the various departments of government,
        (3.) River and harbor improvements.
      b. Commonwealth:
        (1.) For the various departments of government,
        (2.) For education,
        (3.) Public highways, canals, bridges, wharves, etc.
      c. Local:
        (1.) For general departments of government,
        (2.) For education,
        (3.) Streets, bridges, wharves, etc.,
        (4.) Public works — water, gas, electric light, street cars, irrigation works, etc.

d. Educational and benevolent trusts;
(With suitable subdivisions,—schools, colleges, universities, hospitals, asylums, etc.)

B. Public service corporations: (Railroad companies, street car companies, electric light and power companies, gas companies, water companies, irrigation companies, telegraph and telephone companies, etc.)

1. Lands necessarily used in the execution of their functions. (Land held for sale or speculation should be included under C. 1.)

2. Improvements and structures of all kinds necessary to the execution of their functions.

C. Private:

1. Lands:

a. Farm land, (by acre.)

b. Lots,

c. Mining lands and quarries, petroleum wells, etc.,

d. Submerged lands: for oyster-beds, etc.

2. Improvements:

a. On farm lands, including houses, barns and other structures, wind mills and tanks, wells, fences, drains and irrigation ditches, timber, orchard trees, bushes, vines, etc.,

b. On lots,

c. Mining and quarry structures,

d. Wharves, piers, etc.

II. Personal Property, Movables, etc.:

A. Public:

1. National:

a. Arms, ammunition, and all sorts of movables connected with the national defense,
b. Libraries, art galleries, etc.,
c. Furniture of buildings, etc.

2. Commonwealth:
(General subdivisions similar to national.)
3. Local:
(General subdivisions similar to national.)
4. Educational and benevolent:
(General subdivisions similar to national.)

B. Public Service Corporations:
1. Their franchises, patents, good will, etc.,
2. Machinery and equipment,
3. Their furniture and the like,
4. Other cash assets, (*i. e.*, not including any credit claims).

C. Private:
1. Live stock, poultry, etc., whether on or off farms,
2. Farming tools and machinery,
3. Carriages, wagons, bicycles, etc.,
4. Household furniture, paintings, books, clothing, jewelry, firearms, musical instruments, sewing machines, supplies of food, fuel, etc.,
5. Merchandise, goods and wares of dealers or producers, (including beer, wines, liquors, etc.),
6. Tools of mechanics,
7. Professional libraries,
8. Fixtures of saloons, stores, offices, and places of business, typewriters, etc,,
9. Machinery of mills, including engines, dynamos, presses, etc.,
10. Patents, copyrights, good will of business, and other intangible personal property.

D. Gold and silver coin and bullion.

III. Water craft, (unless included in II):

A. Public, including the navy.

B. Belonging to public service corporation:

C. Private:

1. Steam,
2. Sail,
3. All other.[1]

Some such classification as this, proceeding along logical and comprehensive lines, should be made. Its construction would serve several purposes. It would reveal, or call attention to, many forms of wealth not included in the tenth or eleventh census. It would suggest the clearest way of presenting the results. Every form of wealth which may be discovered should have its proper place somewhere in the classification. The precise meaning of each item could be seen at a glance. If such a classification were used, the only explanations necessary would be those applying to cases in which for some good reason items were omitted or combined with others. Finally it would be easily possible to abstract from such a table the figures which represented the items covered in any previous census for comparison with them, and there would no longer be any possible excuse for the naïve comparisons of totals representing unlike quantities.

It is not necessary that the general classification

[1]In the construction of such a complete list of all kinds of property much assistance can be obtained from the lists in use by the assessors in the different states. These lists, which have been expanded as experience demanded, are in many cases extremely comprehensive. By noting every item mentioned in any of these forms, or assessment schedules, and adding the kinds of property exempt, one could make a list of every kind of property in existence. The arrangement of these items according to some logical plan for classification, would then be a simple matter.

adopted should be rigidly followed. In many special instances it would be best to depart from it. For example, the separation of the value of the real estate of railroads from their other property is extremely difficult. The value of the right of way, the road bed, and of the rails, bridges and other structures on the right of way is largely dependent upon their connections with the system. The separation of real estate from personal property in that case would be more or less arbitrary. Here it would be sufficient to ascertain the total value. Should any one desire further details he could obtain them from other sources, such as the Report of the Interstate Commerce Commission. At the same time, if that were done, the total value of railroad property should not be classed as personal property, but should form a group by itself. But the establishment of a working classification as a means of planning the investigation, of checking the different processes, and as a general guide in the presentation of the results, is an absolute necessity.

II. ASSESSED VALUATION OF PROPERTY TAXED AND AD VALOREM TAXATION.

That part of the census of 1890 which deals with the assessment and taxation of property is much more satisfactory than that dealing with wealth. Here we have a most intricate and difficult problem treated in a manner at once clear and comprehensive. For many purposes it would have been advantageous had the limits of the investigation been extended, but within the limits set the results are nearly all that could be desired. The errors and omissions noted are few and very insignificant. The mere enumeration of them would give them a fictitious importance out of all proportion to their

weight. The reviewer's duty thus becomes mainly one of exposition. It will not be amiss, however, to discuss the extensions of the investigation which might, perhaps, be adopted in the twelfth census.

The inquiry was directed to ascertain the assessed value of taxable property and the amount of taxes levied upon that property. The importance of the inquiry arises from the fact that the taxation of property is universal in the United States. In every state and territory in the Union, without a single exception, there is some sort of an assessment, for the purpose of taxation, of a considerable portion of the property of citizens. It is nearly true that every branch of government, below the national, levies taxes upon property.[1]

[1] The only exceptions in 1890 were as follows :

In Connecticut no ad valorem tax on property for state purposes ; nor for county purposes, except in three counties.

In Delaware no ad valorem tax for state purposes.

In Illinois one county levied no ad valorem tax on property except for schools.

In Iowa a number of townships levied no tax on property except for schools.

In Kentucky there was considerable variety in the practice of local governments : in 45 counties there were no municipal taxes on property except for schools ; 14 counties levied no taxes on property except for schools ; in 8 towns and 1 city there were no town or city taxes on property for schools ; and in one county, no county tax for schools.

In Louisiana there were numerous irregularities in local taxation which defy classification, but which altogether are not important.

In Maine 14 plantations levied no state tax except for schools, 1 levied no state tax at all, 1 none for schools, 1 town levied no state tax at all, 1 none for schools, and 11 plantations and 1 town paid no county taxes.

In New Jersey no ad valorem tax for state purposes, except for schools.

In Pennsylvania state ad valorem taxes fell on personal property only.

In Rhode Island there are no county taxes ; the county in this state is merely a judicial district for the state courts, and is not practically a government at all, so that this is an exception in form merely.

The assessed valuation is given under three headings: "total," "real estate," and "personal property." These necessarily follow the definitions given in the tax laws of the different states.[1] When several different valuations were made by different authorities that one was selected which was final or which came nearest to the true value. The purely arbitrary, occasional valuations used in some states for the apportionment of state taxes were not taken. In those cases the local valuations, more frequently revised, were taken.

Ad valorem taxation is stated under the following headings: (1) total, (2) state, (3) county and (4) municipal levy, except for schools; (5) state levy for schools and (6) county and minor divisions levy for schools.[2]

There are certain fundamental difficulties which beset the compilation and presentation of the statistics, and which complicate and largely invalidate any comparisons between different states. These difficulties arise from the differences in the revenue laws of the different states, and from the differences in fiscal prac-

In Vermont there was one town in which real estate was exempt from state taxation and one in which all personal property evaded taxation.

In Wisconsin the state tax on property is only for educational purposes and to meet the debt charges.

There are a few other exceptions which defy classification. For the most part these exceptions are due to peculiarities in the frame of local government, rather than to peculiarities in taxation. It is practically true that there is some kind of ad valorem taxation of some kinds of property in every part of the country. The universality of this method of taxation, in spite of the variety in the forms of government, is a most remarkable fact.

[1] As these vary much from state to state the sums given represent somewhat different things. This logical difficulty which cannot be altogether avoided will be discussed below.

[2] It does not appear to be feasible to segregate the levies for other than school purposes as none of them is universally separated in the public accounts.

tice. The kinds of property assessed are different in every state, or, perhaps more accurately stated, the list of exemptions is different in every state. Thus while in 1890 the California law called for the assessment and taxation of every kind of private property except growing crops, that of Illinois, to choose an example somewhat at random, exempted churches, certain property devoted to education, cemeteries, possessory claims, property devoted to purely charitable uses, free public libraries and the property of agricultural, horticultural, mechanical and philosophical societies. In other states the list of exemptions was different, sometimes longer, sometimes shorter.[1] To add together the assessed valuations of all the states is, therefore, from a certain point of view, to commit the error against which school children are warned when studying arithmetic; namely, adding unlike quantities, such as two potatoes and three apples. Not only is the legal definition of assessable or taxable property different in every state, but the practice of the states is so varied as to give a still more uncertain meaning to any figures stating the assessed valuation. The rate of assessment to the true value and the kinds of property which are actually reached or which escape vary from state to state. For example, the assessment of property in California was in 1890 at about two-thirds of the true value, in Illinois at less than one-fourth. At the same time a far larger proportion of taxable property was reached in California than in Illinois.

Of the differences due to the law the census very properly took cognizance by outlining the revenue laws

[1] The entire list of exemptions is constantly changing, generally increasing. Its growth and the variations in differents parts of the country afford a most instructive commentary on the tendencies of democracy and the forces which determine legislative action.

of each state. But little or nothing is said, directly, about the differences in practice. Some light can be had as to the rate at which the real estate is assessed by comparing the assessed value of that kind of property with the true value as given by the census in connection with the estimate of wealth. But, as we have seen, the estimate of wealth is not very satisfactory. Nothing is definitely stated as to the amount of taxable personal property which is exempt or which escapes, nor as to the rate at which the balance is assessed. From no data given by the eleventh census is it possible to ascertain these facts. The estimate of the true value of all tangible wealth is of no use in this connection. First, because not all of it is taxable, and secondly, because many things are taxable which are not tangible wealth. It is for these reasons that the reduction of the assessed valuation to a per capita rate or of ad valorem taxation to a rate on the total true valuation or on the assessed valuation has little practical value for purposes of comparison. Thus, for example, we are told that the assessed valuation of Illinois is $153.53 per capita and of California, $737.88 per capita, and, that the rate in Illinois, of all taxation, is $4.09 on each $100 of assessed valuation, and of California $1.70. We are further told that the true value of taxable real estate in Illinois was $3,108,000,000, of which the assessment was 18.85 per cent. The true value of taxable real estate in California (which we must not forget differs in some items from the kinds of real estate taxable in Illinois) is given as $515,500,000, which is assessed at about 60 per cent. That is, real estate taxed in Illinois bears a burden of about 1.06 per cent; in California, 1.24 per cent.[1] But

[1] There are quite a number of other corrections which should be

it is not possible to go any further than this in estimating the burden of ad valorem taxation. The most serious omission is that the true valuation of personal property that is exempt is not given; nor are we informed as to the amount of taxable personal property which escapes by fraudulent evasion, or the rate at which the remainder is assessed. To make the information concerning ad valorem taxation complete the next census should endeavor to ascertain the following details in addition to those given in the eleventh: (1) What part of the real estate exempt from taxation in each state is private property and what part belongs to some branch of the government?[1] (2) What part of the personal property in each state is exempt and what part of that belongs to the government? (3) How much personal property escapes taxation by fraudulent evasion, and at what rate the balance is assessed? (4) If the estimate of wealth is, as it has been in the past, confined to tangible wealth, how much intangible wealth is assessed?[2]

In connection with the difficulties which the investigation into ad valorem taxation has to encounter, we must not overlook the lack of uniformity in the definition of real and of personal property in the different

applied before even this comparison is permissible. The distribution of railroad property between real estate and personal property is not the same in the assessed valuation as in the true valuation. In California a certain amount of unpatented land is taxed as personal property under the head of possessory claims; this is exempt in Illinois. In California all realty not belonging to some branch of the government is taxable and in Illinois a considerable amount of such realty is exempt. All things considered, it is probable that the average burden on real estate is about the same in each of these two states.

[1] The true value of all exempt real estate was estimated by the eleventh census.

[2] Should some such outline as that above suggested for the estimate of wealth find favor and be adopted, it would be comparatively easy to ascertain these items.

state revenue laws. Remarkable as it may seem, the revenue law definitions do not conform very closely to the common law distinctions nor to the accepted ideas. As a result of these differences of definition some of the most curious results are shown by the statistics presented in the last census. Thus, for example, it seems at first glance inexplicable that in the more recently settled states or territories the proportion of personal property taxed to the total amount of property taxed should be so large as it is shown to be. In Montana, Wyoming, New Mexico, Arizona, Nevada and Idaho the amount of personal property assessed exceeded that of real estate assessed. This appears to be very remarkable when we note that for the country at large the assessed valuation of personal property is only one-third that of real property and in most of the older states even less, while the census estimate of the true value of personal property is only two-thirds that of real property. The fact is that this difference is largely a matter of definition. In the states named improvements upon lands the fee to which had not yet been acquired by the settler and, except in Idaho, the value of his partially matured claim to the land were assessed as personal property.[1] The significance of this difference of definition is apparent when we notice that in these states and territories more than half of the real estate (by true value) was exempt from taxation, and that in the Western division, which includes these states, 46.6 per cent of all real estate was exempt, against less than 10 per cent in all other divisions.[2]

[1] Idaho, Illinois and Iowa exempted possessory claims.

[2] Per cent of real estate exempt from taxation, 1890. (Deduced from Table 2, Wealth, Debt and Taxation, 2 : 13.)

The United States_____9.3 per cent.
North Atlantic Div.___8.7 " "

The greatest difficulty is that no two states of the Union have the same revenue system, no two of them assess property in exactly the same way, nor do they assess the same kinds of property. So that, although the general property tax does appear in every state, it appears in a great variety of forms which cannot readily be reduced to that uniformity required in statistical tables. Upon this point, and after calling attention to these and other irregularities in commonwealth taxation, Professor Seligman said in 1889: "The inference from all these facts, so far as our present purpose is concerned, is that the statistics of valuation and assessment are of exceedingly little value for purposes of comparison. If all the property, or if even all the real estate, in the commonwealths were assessed at some fixed ratio to its actual value, we would at least possess some data for comparison. But as long as each commonwealth or county appraises its property at an arbitrary rate which does not appear on the books and which differs in each instance, it is manifest that the figures afford no exact criterion of actual proportions, and that any conclusion based on the assumption of the correctness of the statistics would be utterly fallacious."[1]

South Atlantic Div.---7.1 per cent.
North Central Div.---6.3 " "
South Central Div.---11.1 " " (Includes Oklahoma and Indian territory exempt.)

Western Division----46.6 per cent.

Montana ----------47.4 per cent.
Wyoming ----------71.4 " "
New Mexico---------66.7 " "
Arizona ----------73.4 " "
Nevada ----------72.6 " "
Idaho ----------70.3 " "

Of course, a very large portion of this was government land proper; still a large amount is in process of acquisition by private individuals.

[1]Am. Stat. Assn. *Publications*, 2; 410 (1889).

III. RECEIPTS AND EXPENDITURES OF NATIONAL AND LOCAL GOVERNMENTS.

Of the matters presented in this part of the investigation we shall consider only that referring to state and local governments, and we shall omit any consideration of municipal or city finance.

Under the head of receipts we have an outline of the monies covered into the various treasuries during the fiscal years ending in 1890. Some confusion arises from the fact that the date to which the investigation refers is not as clearly stated as it might be and that it differs from that to which the section on assessment and ad valorem taxation applies. The ad valorem taxation referred to in the first part is generally that levied on the assessment made during the year 1890, and hence was mainly for the support of the governments during the year 1891. That referred to in the second part is for the most part that which was levied on the assessment of 1889 and paid during 1890. There could be no serious objection to such changes of date as this if they were always clearly stated in some prominent place. But one fault of the eleventh census is that the date to which the statistics refer is frequently hard to find, being buried in the explanatory text, and not at all uniform.[1]

The receipts of the state and local governments are given under the following headings:

Total.

[1]In some of the tables, notably those showing the receipts and expenditures of the states in detail and of the counties in the same way, a most excellent plan is followed of introducing a column showing the exact date to which each line of figures refers. Some such plan should be carried through the whole of the work. In this respect the tenth census was superior, the explanatory text being in every case headed by a statement of the date to which the figures refer.

Ad valorem taxes on real and personal property.
Corporations separately reported:
    Banks and bankers,
    Railroads,
    Other.
Licenses:
    Liquor,
    Other.
Penal and reformatory institutions.
Income from funds and investments.
Water works and other enterprises, net.
Sale of property.
Fees, fines and penalties.
Special assessments:
    Streets and bridges,
    Sewers.
Interest on deposits.
Reimbursements and miscellaneous.

In a general way this classification is most excellent. It is certainly clear and logical. Little improvement upon it can be desired. The labor which it cost to rearrange the complex accounts of the public monies, which are kept by about as many different systems as there are separate treasuries must have been tremendous. The few tests that I have been able to apply show the work to have been done carefully and accurately. The only questions for consideration in connection with the plan of the twelfth census arise in connection with the desirability of more detail on certain points.

Ad valorem taxes on real and personal property furnished, in 1890, approximately 75 per cent of the total receipts of state and local governments. The balance was raised by special taxes and other forms of revenue cited in the above list. Many of these special sources

of revenue are of growing importance, while the general property tax is not holding quite the same position of relative importance among the different revenues which it held some years ago. It is unfortunate that the tenth census afforded no statistics from which we can measure the development of new sources of income. For this purpose it would be desirable if some of the items were given more in detail. Although the item of miscellaneous is only $27,000,000 out of a total of $584,000,000 or only 4.8 per cent, yet it embraces at once the oldest and the newest taxes in use, and some of the most interesting sources of revenue. Among other things it includes poll taxes and inheritance taxes. That the former were not segregated is remarkable in view of their age and general prevalence. But the interest in the latter is more recent than the eleventh census. In 1890, inheritance taxes existed in but five states. Between that date and the close of the legislative sessions of 1897 the older forms of the inheritance taxes have been much extended and ten other states have adopted that method of obtaining revenues.

Under taxes on "corporations separately reported" two things appear to be confused, which it would be well to keep separate. They are: (1) the taxes levied upon certain corporations as banks, and railroads, under the regular forms of and by the method of the general property tax, and (2) special taxes upon corporations according to some other plan. Thus in California a part of the taxes on railroads happen to be separately reported merely because certain forms of railroad property are assessed by the state board of equalization and not by the county assessors, a method of procedure involving no change whatever from the principles of the general property tax of which this is a part; while in

the same column we find the corporation taxes of Pennsylvania, Connecticut and other states, which are based upon entirely distinct principles and methods.[1]

In a general way it may be stated that more detail is desirable in all statements of receipts other than taxes on assessed valuation, and the meaning of the figures should be more fully explained. The headings and the columns give an artificial appearance of uniformity that is entirely lacking as a matter of fact. Taxation varies in character so much from state to state that no bald statement of figures is adequate. It is not possible to assume that many, if any, of the users of the census are sufficiently familiar with the law and practice of the different states to interpret the figures given correctly. Every table should, therefore, be accompanied by full explanations.

Of the tables concerning state expenditures little need be said. So far as they go they appear to be eminently satisfactory. The expenditures are given under the following headings:

Legislative,
Executive,
Judicial, including county courts, inquiries, and inquests,
Military,
Educational purposes and public schools,
Charitable,
Interest,
Penal and reformatory,
Buildings and sites, including care and maintenance,
Waterworks and other enterprises, net,

[1] Moreover all of the taxes on railroads in California are not separately reported, a part being included in the assessment made by the county assessors.

Salaries separately reported, fees, and commissions,
Roads, sewers, ditches, and bridges,
New buildings, works, and sites, separately reported,
Police,
Public parks and places,
Fire,
Health,
Lighting,
Miscellaneous.

The uses to which statistics of public expenditure may be put are so varied, the expenditures themselves are so complex that a strict classification is practically impossible and the broad divisions above cited are probably as satisfactory and generally useful as could be devised. Especially valuable are the tables showing the receipts and expenditures of the commonwealths for each year of the decade from 1880 to 1889. These tables are full of instruction and interest and should if possible be continued.

IV. GENERAL CONCLUSION.

While the investigations of the eleventh census into taxation are eminently satisfactory within their acknowledged limits, there is still room for considerable expansion and rearrangement before the final scheme is adopted to be continued by each census throughout the twentieth century. In the first place the point of view from which the whole investigation is conducted should be changed. In the earlier censuses the investigation into state and local taxation was made, not for its own sake at all, but as a part of an attempt to ascertain our national wealth. The same purpose to a large extent

prevailed in the eleventh census, although large sections were added which dealt with public finance merely for its own sake. It is now time that a new point of view should be chosen. The investigation should no longer be one into assessment and taxation, in which taxation is simply an after-thought and the assessment the prime object of research. We should have an investigation into taxation for its own sake; assessment will then fall into its proper place as a subordinate part of taxation. So far as the assessment throws any light upon valuation or wealth it can still be used. But as was shown in the first part of this review the light obtained from the assessment upon the true wealth of the country is very small.

The proper aim of the second part should be to ascertain the amount and character of the public revenues and expenses. This aim is of sufficient importance to justify its separate treatment. All sources of revenue should be given equal attention. The importance of the general property tax and with it of the assessment of property is gradually declining. That of other sources of revenue is increasing. Unfortunately we have no statistics of local taxation more recent than those of the census of 1890. But we have some light upon the development of commonwealth taxation, and it is fair to assume that local taxation will show the same general tendencies, although not to the same extent. In 1890, about one fourth of the revenues of the states was raised by means other than the general property tax. In 1900 the proportion so raised will be considerably greater. According to an investigation made by Dr. E. D. Durand for the New York State Library[1] covering commonwealth

[1]See Library Bulletin—Legislation, No. 8, March, 1897; State Finance Statistics, 1890 and 1895.

revenues and expenditures, the receipts from the general property tax by the commonwealth alone were about the same in 1895 as they were in 1890, while the receipts from other sources, or from special forms and applications of the general property tax, having practically the same significance as new taxes, increased about 25 per cent. That is, the entire increase in the revenues of the states was from sources other than the general property tax. These new sources of revenue should be more fully treated as their importance grows.

The eleventh census took cognizance of all sources and forms of revenue, so that this suggestion involves no fundamental change in the plan of the census. It merely calls for more emphasis on certain parts and a slight rearrangement of the items so as to show the relative importance of the different parts more accurately.

V. APPENDIX.

In the foregoing discussion several references have been made to the use by the eleventh census of inadmissible comparisons. To make the criticism more concise, it is in order to append a list of the tables which seem to offend, with the reasons for the criticism in each case. The list contains only the general tables. Many detailed statements expanding these tables are, as a matter of course, open to the same criticisms.

(1) The table in the text, page 9, first part. True valuation for each census year 1850 to 1890, inclusive: total, per capita, and increase per cent.

The comparison here drawn is inadmissible because the true valuation is of different things in each census; that is of different categories of wealth. Furthermore, the estimates were made by different methods each time,

so that the term true value has a different meaning in each case.

(2) Table 3, page 14. "Comparative summary of the true valuation of real and personal property, total and per capita, by states and territories (exclusive of Alaska): 1850 to 1890."

This table gives again the comparison just criticized and is open to the same objection.

(3) Table 5, page 16. "True valuation of real and personal property, arranged in order of amount; per capita valuation, per cent of true valuation of real estate and improvements of total valuation, assessed valuation of real and personal property taxed, and per cent of assessed valuation of true valuation, by states and territories (exclusive of Alaska): 1890."

The criticism here affects the column headed "per cent of assessed valuation of real and personal property taxed of true valuation." This column purports to give the rate of underassessments and evasion. If that is not what it was inserted for, it is meaningless and useless. But as a matter of fact it gives something very different and totally illogical. The comparison is actually between the assessed value of property taxed and the true value of all property taxable and untaxable, assessed and unassessed. It tells us neither the rate of underassessment, nor the percentage of evasion, nor the percentage of property exempt. The quantities dealt with have an entirely different quality in each state; or, in other words, the intention of the terms used varies from state to state so that comparisons are absolutely impossible.

(4) Table 1, page 59. "Summary of the total and per capita assessed valuations of real and personal property

taxed, by states and territories (exclusive of Alaska, Oklahoma, and Indian territory): 1850 to 1890."

Also the second part of the table in the text, page 9, relating to the assessed valuation of real and personal property taxed, showing the total, the per capita and the increase per cent for each census: 1850 to 1890.

The assumption made in the text (see page 11), and carried out in these tables, that the increase in the assessed valuation of real and personal property taxed shows an increase in wealth is naïve in the extreme. An increase in the assessed valuation of property, total or per capita, may mean any one of several things besides an increase in wealth. It may mean, for example, that the rate of assessment has been raised, or that property which evaded taxes has been reached. The assessment may remain stationary or increase while the amount of wealth decreases. Whatever may be the law or the assumed practice the fact remains that the assessed value is a more or less arbitrary value placed upon certain kinds of property for purposes of taxation. Its increase or decrease year by year has no relation to the true value. It is not unusual for a state board of equalization to raise the assessment of a state or of a large part of a state from 5 per cent to 20 per cent in a single year. A revision of the tax law of California in 1872 more than doubled the assessment in a single year. It would be hard to prove that the wealth of the state doubled in that one year.

The increase or decrease in the assessed valuation has a bearing on taxation. It has nothing directly to do with wealth.

(5) Table 3, page 61. "Summary of the total and per capita ad valorem taxation and the rate per $100 on the total assessed valuation, by states and territories (exclus-

ive of Alaska, Oklahoma, and Indian territory): 1860 to 1890."

Without proper reference to the other sources of revenue the increase or decrease in ad valorem taxation per capita has little significance.

The charts and maps displaying these comparisons are open to the same criticisms.

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Suggestions in Regard to the Statistics of Municipal Finance in the Census of 1900.

The natural starting point of this discussion is the municipal finance statistics of the eleventh census. These statistics are included in two volumes on Wealth, Debt, and Taxation, and are divided into three general groups as follows:

1. Statistics of indebtedness. (Pt. I.)
2. Statistics of assessed valuation and ad valorem taxation. (Pt. II.)
3. Statistics of receipts and expenditures. (Pt. II.)

We shall first make certain suggestions relative to the general scheme of presentation as a whole and shall then take up each of the three parts separately. In doing this it will contribute to clearness and completeness of presentation to embody suggestions in the form of schedules,[1] the use of which, it is believed, would yield the desired results. They should be regarded merely as suggestions subject to alterations in detail as experience in carrying out the work may show to be desirable. Systems of municipal finance are so diverse that it would be impossible to determine beforehand in detail the most desirable schedules. This can be done only with all the facts at hand. It is believed, however, that these schedules in their main principles of classification, are practicable and would yield valuable results.

SUMMARY OF PRINCIPAL SUGGESTIONS.

1. Treat the different branches of municipal finance (debt, valuation, taxation, revenue, expenditure) together, thus presenting a view of the subject as a whole.

[1] Appendices I–III, pages 455,ff.

2. Treat separately the different sorts of municipalities, laying special emphasis on cities, and, among cities, on the larger cities.

3. Divide cities into several groups on the basis of population and combine with this classification a classification according to states and groups of states.

4. In order to save space and expense give, in the case of the smaller cities and other municipalities, only the combined figures for each population group within each state.

5. Treat receipts and expenditures, of cities especially, in greater detail and with a better grouping of items than was done in the eleventh census, distinguishing expenditures for operation and maintenance from expenditures for additions to real estate and equipment.

6. In combining the figures for states, counties, and municipalities, give the per capita as well as the actual figures and show what percentage of the population of the state is included in each group of municipalities for which figures are given.

I.

GENERAL SUGGESTIONS.

1. The first criticism of the eleventh census that suggests itself is that it contains no presentation of the statistics of municipal finance as a whole. In presenting the finance statistics of the various political and administrative divisions of the country there are possible two principles of classification which we may term the financial and the political or administrative. According to the former our primary classification rests on the distinction between classes of financial phenomena: debt, valuation and taxation, revenue and expenditure. The

facts in regard to each political and administrative division are separated and grouped, with like facts collected from other political and administrative divisions, under the general class to which they belong. In this way we obtain a view of public indebtedness as a whole, of valuation and taxation as a whole, and of revenue and expenditure as a whole, but not of the financial systems and conditions of states, counties, cities, etc. Our knowledge of these comes piecemeal and not as a whole.

If the second of the two possible methods be adopted, the primary distinction is that between the different sorts of political and administrative bodies. The main divisions would then be statistics of state finance, statistics of county finance, statistics of municipal finance, etc. The facts, to whatever division of finance they belong, would then be grouped primarily according to the sort of political or administrative division in connection with which they occur. We should then have a view of the finances of states, counties, etc., but not of public indebtedness, etc., for the country as a whole. It cannot be said that one of these methods of classification is more correct than the other. It is not a question of correctness, but of which method is calculated to throw more light on questions of public finance in the forms in which they commonly present themselves and are studied. The census has adopted the financial principle of classification and in so doing, it has, I believe, made an error of judgment. We are interested not so much in the study of public indebtedness, of valuation and taxation, of public revenue and expenditure, as we are in the financial systems and conditions of our states, counties and cities. The different parts of the financial

system of a state or a city have a bearing upon each other, a unity, the significance of which is lost when these parts are separately treated. I would suggest, therefore, the great importance of presenting the statistics of municipal finance as a whole, and, in general, although the suggestion falls outside the scope of this report, that the primary classification of finance statistics be on the basis of political and administrative divisions.

It is true that the question between the two principles of classification is largely one of emphasis. Whichever principle is adopted as primary, full summaries in accordance with the other should be presented. If the eleventh census had done this, there would perhaps be no ground for criticism; but the only attempt to present the main facts of municipal finance as a whole is contained in a single table[1] and is only partial in character, containing no statement of revenue and expenditure. The table referred to presents the figures for each municipality having a population of 4,000 or over in 1890, the grouping being by states with the order under each state alphabetical.

The figures for revenue and expenditure are elsewhere[2] given for each municipality of 4,000 or over, and there is no apparent reason why a summary of these figures should not have been incorporated in the table in question and its value thereby greatly increased. A schedule which it is believed would present a satisfactory summary of the finances of municipalities is suggested in appendix I.[3] The terms employed with reference to receipts and expenditures are taken from the tables

[1] Eleventh Census. Wealth, Debt and Taxation, 2: 376–403.
[2] *Idem*, 2: 558–599.
[3] See below, p. 455.

showing the same facts in detail and should be interpreted in the light of those tables.[1]

The schedule proposed involves much more than the mere addition of a summary of receipts and expenditures to the schedule employed in the eleventh census, but the facts and comparisons called for are not more detailed than is necessary to fulfil the purpose of such a summary. This should be, not merely to present and relate to each other the main facts of municipal finance at the census date, but also to relate these facts to similar facts of earlier periods and thereby furnish the data for observing both the existing condition and the tendencies at work in the development of municipal finance.

2. In order to get the best results it will be necessary to distinguish and treat separately the different sorts of administrative bodies hitherto included in the census under the head "municipality." The use of this term in the census varies somewhat in different portions of the work, but in all cases it is made to include administrative bodies very unlike in character.[2]

[1] Appendix III, p. 457.

[2] "The statistics of municipal indebtedness embrace the amount of indebtedness of every city, village, borough, town, township, fire, water, or irrigation district, precinct, and plantation in the United States, being, as far as known to this office, all the political divisions of the state less than county having power to contract debt, except the school district, and the poor district of Pennsylvania." Wealth, Debt and Taxation, 1 : 75.

"The term 'municipality,' as used in these tables, includes cities, townships, towns, villages, boroughs, and all other incorporated divisions of a county, exclusive of school, irrigation, and fire districts." *Idem*, 2 : 101.

No definition of "municipality" is given in connection with the statistics of receipts and expenditures, but an examination of the tables will show that it includes only cities, towns, villages and boroughs. Apparently, however, when practicable, the accounts of administrative bodies having special functions and doing their work within the boundaries of the city or corresponding division are included in the accounts of the latter. This at least would seem to be a

This grouping of dissimilar objects is unfortunate. The same reason which leads to the separate treatment of the finances of state, county and municipality should lead us if possible to distinguish, at least, between the city and the unlike administrative bodies with which it is grouped in the census. A city, as distinguished from other municipal bodies, deals with the interests of a compact community and performs a great variety of functions, many of which are the direct outgrowth of the density of population in the community which it serves. The same conditions which determine its character as an organization determine also the character of its expenses, the sources of revenue which it controls, and hence its financial system. It is certainly desirable to separate so far as possible the statistics dealing with the financial systems of such bodies from the statistics dealing with the financial systems of towns and similar administrative districts, the organization and financial systems of which are determined by the needs of scattered populations living under conditions essentially different from those of the city community. It would be a distinct gain if the municipal finance statistics of the twelfth census should treat separately: 1. cities; 2. towns, townships, villages and boroughs; 3. minor administrative divisions other than, and not included in, those mentioned under 1 and 2. The more important classes among the divisions included under 3, viz, school, poor, fire, irrigation districts, etc., should be separately noted.

fair inference from the statement (*Idem*, 2 : 407): "In municipalities having less than 50,000 population the expenditures for schools not under immediate municipal direction are not included, the district having charge of such expenditures being independent and frequently not co-extensive with any municipality."

Whatever may be thought of any one of the above uses of the term, there can be no doubt that the use of the term in different senses in the different branches of the work is a distinct disadvantage.

It must be admitted that it is a matter of some difficulty always to distinguish between the city and other municipal bodies. We must be guided by facts, not names. We are concerned not so much with the study of "cities" as of administrative bodies performing city functions. Thus, if within the area organized as a city, there exist other administrative bodies such as a town, school district, fire district or borough, having boundaries practically conterminous with those of the city and performing functions commonly performed by a city government, their finances may be properly included with those of the city.[1]

If a compact community, in which have developed the needs characteristic of the city, still retains its primitive form of organization as a town on which, perhaps, have been imposed special forms of organization to meet new needs as they arose, such a town or group of administrative bodies may properly be treated as a city, provided that, where a number of organizations exist within the same territory, they are so nearly conterminous as to make it practicable to combine their financial statements. The line between cities and other administrative divisions is not, therefore, perfectly clear. The only rule is to accept the form of organization as prima facie the determining factor, admitting exceptions as occasion seems to require.

The practice of the tenth census in regard to grouping the accounts of different administrative divisions,

[1]No exception should be made in the case of the school district. There is, of course, no objection to a separate presentation of the finances of the public school system, but the management of the schools in many parts of the country is in the hands of the cities and towns and even when this is not the case the expenditures for schools, and the indebtedness incurred on account of them, are a part of the expenditures and indebtedness of the city and town communities in which the schools are situated.

serving the same city community, in the tables of receipts and expenditures of cities with a population of 7,500 or more, was much more clearly stated, and apparently more nearly in accord with the principle above suggested, than was the case in the eleventh census. The explanatory notes, preceding the tables of receipts and expenditures and showing the practice followed with reference to each state, which we find in the tenth census,[1] are wholly lacking in the eleventh. The determination of the exceptions must be to some extent a matter of judgment, and the results consequently only approximate, but it is believed that the distinction could be made sufficiently accurate to be of great value. Whatever the decision reached it should hold good for all branches of the statistics presented, otherwise the results reached in these different branches cannot be brought into relation with each other.

3. Comparatively little attempt at grouping is made in the municipal finance statistics of the eleventh census. In the table showing municipal debt in detail[2] municipalities are grouped geographically under the states and counties in which they are situated, but there is no grouping according to population. In the table showing debt less sinking fund and population for 1880 and 1890,[3] separate totals are given for places with a population of 4,000 or over, and places with a population less than 4,000, grouped according to states, according to the geographical groups of states, and for the country as a whole. In the tables[4] showing the purposes of issue, the rates of interest and the dates of maturity

[1] Tenth Census, 7 : 215–218.
[2] Eleventh Census. Wealth, Debt and Taxation, 1 : 329–534.
[3] *Idem*, 535–554.
[4] *Idem*, 556–851.

of bonds, the grouping is merely geographical, by states and counties, the figures for each place with a population of 4,000 or over being separately given. In the table showing principal of debt, annual interest charge, average rate of interest, and interest charge per capita,[1] distinction is again made between places with 4,000 or more population and those with less, separate totals for the two classes being given for the country as a whole, for the great geographical groups of states, and for each state separately.

In the tables dealing with assessed valuation and ad valorem taxation,[2] no attempt is made at other than geographical classification by states and counties.

In the tables dealing with receipts and expenditures[3] distinction is made between places with 50,000 or more population, and those with 4,000 but less than 50,000. The cities of 50,000 and over are arranged in the order of population; those with a population of 4,000–50,000 are arranged alphabetically under the states in which they are situated. Classification on the basis of population might advantageously be carried much farther. The size of a city exercises a strong influence on its finances and there is no way in which the character and extent of this influence can be indicated other than by classifying cities on the basis of population. The following classification would not be too minute for this purpose:

1. Cities with population of 250,000 or over.

2. Cities with a population of 100.000 but less than 250,000.

3. Cities with a population of 50,000 but less than 100,000.

[1] *Idem*, 856–861.

[2] *Idem*, 2 : 102–373.

[3] *Idem*, 410–411, 420–451, 554–557, and 560–599.

4. Cities with a population of 25,000 but less than 50,000.

5. Cities with a population of 10,000 but less than 25,000.

6. Cities with a population of less than 10,000.

Within each of these classes the geographical grouping by states and groups of states should be preserved in order to bring out the influence exercised both by geographical situation and administrative organization. It does not, however, seem advisable to follow the practice of the eleventh census in many of its tables, and carry the geographical classification to the extent of grouping the cities within each state by counties. To do so would be practically to destroy the value of the classification by population without any compensating advantage.

Whether the primary classification should be on the basis of population or geographical situation is not a matter of the first importance. It is important that the two principles should be combined and that the scheme of classification followed should be uniform throughout all branches of the statistics presented.

The financial systems and condition of the larger cities, present problems of the first importance and should be treated in much greater detail than would be practicable for all cities. This detailed treatment should certainly extend to all cities with a population of 100,000 or over and if possible to those with a population of 50,000 or over. In the case of the smaller cities not only would the more limited character of their functions involve a less detailed treatment but such cities might advantageously be grouped (only the figures for the group as a whole being given) and much space

thereby saved for the presentation of more important matter.

4. While statistics of municipal finance properly classified throw much light on the character and extent of municipal functions and the differences which exist in this respect between municipalities differing in size and belonging to different political systems, it is equally true that it is essential to the formation of a sound judgment in regard to the finances of cities, and still more to an intelligent comparison between the finances of cities belonging to different political systems, that we have a knowledge of the powers and functions assigned to the cities in question, and of the rôle which they play in the political and financial systems of which they form a part. This knowledge can be furnished only by explanatory text. Such explanatory matter is furnished in both the tenth and eleventh censuses, in connection with the statistics of debt, valuation and taxation, but in neither census is there adequate explanatory matter in connection with the receipts and expenditures of cities, making clear their relation to the receipts and expenditures of other minor divisions and the state itself.

II.

STATISTICS OF INDEBTEDNESS.

Presentation in the eleventh census.—The figures of municipal indebtedness in the eleventh census are given in the following tables, omission made of certain tables of summaries.

1. A detailed statement by states and counties,[1] showing for each municipality, total debt less sinking fund (1880, 1890), debt of 1890 in detail (bonded, floating,

[1] Wealth, Debt and Taxation, 1 : 330–534.

sinking fund), population (1880, 1890) and debt less sinking fund per capita, (1880, 1890).

2. "Total and per capita indebtedness of municipalities having 4,000 or more population" by states.[1]

3. "Purpose of issue, rate of interest, and date of maturity of bonds of the states, counties, and municipalities of 4,000 or more population outstanding in 1890."[2]

4. "Statement showing the national, state, and classes of the local bonded debt of the United States, and the amount, average interest rate, and per capita interest charged thereon for 1890."[3] In this table municipalities are not treated single, but totals, by states and groups of states, are given, for municipalities with 4000 or more population and for those with less than 4000.

Suggestions.—In addition to the general suggestions already made, namely, the division of municipalities into 1, cities; 2, towns, townships, villages, and boroughs; 3, other minor administrative bodies; and the more extended classification of cities on the basis of population, it is believed that the following changes and additions would constitute real improvements:

1. Omit tables described under 1, 2 and 4 above. Those portions described under 1 and 2, which make comparisons between successive census years have already been provided for in Appendix I. Those portions dealing with the debt of 1900 in detail are provided for in the schedule proposed under 3 b, below. Those portions described under 4 above, which show principal of bonded debt, interest charge and average

[1] *Idem*, 1 : 536–554.
[2] *Idem*, 1 : 562–851.
[3] *Idem*, 1 : 857–861.

rate of interest are provided for in the suggestions made under 2 below and the per capita interest charge is shown in the schedule proposed in Appendix I.

2. Add to the table described under 3 above, one showing the dates of issue of the debt outstanding in 1900. Such a table was included in the Tenth Census.[1] It affords valuable information and there is no apparent reason why it should have been omitted in 1890.

In that portion of the table dealing with "purpose of issue" some changes might advantageously be made. "Cemeteries," the aggregate debt incurred on account of which is returned as $196,250 might be omitted. Rivers and harbors, wharves, and canals, might be stated separately. Issues in aid of railroads might be distinguished from issues in aid of other private industrial enterprises. "Streets" might be subdivided into "acquisition of land," "opening and construction," "maintenance and repair." Gas works, electric light and power works, conduits, and other industrial enterprises which might prove to be of sufficient importance should be added. The item "refunding old debt" should be reduced as much as possible by distributing it under other headings, in so far as it is possible to obtain the requisite knowledge of the character of the debt refunded. It is not evident how far this attempt was made in the eleventh census but the amount entered under this head,[2] $291,095,556 out of a total bonded debt of $1,135,794,064, is so large as seriously to diminish the value of the table. While these changes would considerably increase the value of the table, they would not prevent the making of comparisons with the figures for 1890 and 1880. It would be advantageous

[1] Tenth Census, 7 : 718–753.

[2] Wealth, Debt, and Taxation, 1 : 557.

also to state in connection with the debt issued for each purpose what percentage it constitutes of the total issue.

To that portion of the table showing the amount of debt issued at various rates of interest should be added columns showing total interest charge and average rate of interest.

There should also be added tables of summaries showing, at least for the different classes of cities, the figures for 1900 in comparison with those for 1880 and 1890.

3. Add tables showing for the larger cities:
   a. the debt movement during intercensal years.
   b. a comparison for the census year between debt and productive assets.

   Schedules I and II, appendix II, are suggested as adequate for these purposes.

It certainly shows the want of a sense of proportion in the census that the debts of the larger cities are treated in much less detail than are the debts of the states, although the latter are much less in amount than the former, are diminishing rather than increasing, and present no problems equal in importance to the problems connected with the enormous and increasing indebtedness of our great cities.[1]

[1] The bonded debt of the states in 1890 aggregated $224,175,044. The aggregate bonded debt of New York, Philadelphia, Chicago, Brooklyn, Baltimore and Boston exceeded the debt of the states by $120,093,211. The census of 1890 (*Idem*, 1: 147–243) not only gives for the states both classes of facts called for above under "a" and "b" and extends the table showing cash and productive assets so as to cover the intercensal years, but (*Idem*, 1: 81–145) provides a full explanatory text describing both the character of the debt and various productive funds.

III.

ASSESSED VALUATION AND AD VALOREM TAXATION.

The figures for municipalities are given by states and counties,[1] the municipalities being arranged alphabetically under the counties in which they are situated. The figures for each state are preceded by text giving an account of methods of assessing and levying taxes in the state.

The items of this tabulation so far as concerned with cities are provided for in the summary table suggested in Appendix I. In its place it would be valuable to show the details of assessment so far as possible; for real estate, to distinguish the assessment on land from the assessment on improvements; for personal property, to show separately assessments on machinery, stock in trade, securities of corporations, mortgages and such other forms of personal property as the assessment lists when examined might show to be of sufficient importance. It is impossible, however, to propose any schedule covering these facts until an examination of assessment lists shall show in regard to what sorts of property separate statements can be made for a sufficient number of cities to justify the attempt.

IV.

REVENUE AND EXPENDITURE.

General considerations.—There can be no doubt that this branch of finance statistics presents difficulties much greater than those of the branches above considered. Before taking up the schedules in detail attention should be called to the following general considerations which

[1] *Idem*, 2 : 103–373.

should influence both the arrangement and the interpretation of the schedules.

1. In no branch of municipal finance statistics is there greater need of an introductory text showing the part assigned to municipalities in the administrative system of the state.

2. The figures should represent so far as possible *city*[1] revenue and expenditure only, excluding those items of revenue and expenditure which are found in the municipal accounts only because the city acts as the agent of other political and administrative bodies in the collection and expenditure of revenue. When the city collects the state taxes along with its own, the method of treatment is simply to deduct such items from both sides of the account. But when the state pays the city for caring in its institutions for certain inmates, or makes a grant for the support of some branch of city work, the proper course is not quite so clear. Such payments and grants are in a sense a portion of the city's revenue, and their expenditure a portion of the city's expenditure, but they constitute also a portion of the revenue and expenditure of the state and evidently can not be counted for both city and state when we consider the finances of the state and city as portions of a single whole. Probably the best way is to include such items in the figures for the city but to state them separately so that they may be easily deducted when the purpose in view renders it necessary.

3. The figures should represent real revenue and expenditure as distinguished from that which is merely nominal. Thus revenue and expenditure growing out of the sale or purchase of securities incident to changes

[1] The term "city" is used for brevity. What is said of cities would be true of other municipalities also.

in the investment of funds form no part of the revenue and expenditure for municipal purposes.

Many cities keep their accounts in the form of "funds," transfers between which appear as revenue or expenditure in the accounts of the separate funds, and as both revenue and expenditure in the accounts for the city as a whole, when these are made up by simply adding together the accounts of the different funds. Such nominal revenue and expenditure should be carefully excluded. To accomplish this we must treat all revenue and expenditure as going into and out from a single treasury. All balances on hand at the beginning or end of the year, to whatever fund credited, should be treated as portions of the balance in the general treasury; all payments from funds, except transfers to other funds or to the general treasury (which transfers should be omitted), should be treated as payments from the general treasury; and all revenue credited to such funds, except transfers from other funds or from the general treasury (which transfers should be omitted), should be treated as revenue received by the general treasury. In this way alone can we obtain a true statement of actual revenue and expenditure. While in the case of "funds," it is comparatively easy to follow out this principle, there are somewhat analogous cases which present serious difficulties. Such a case arises when one department renders services or supplies materials like water or lights to other departments of the city government. These services may be rendered free of charge or charged to the department using them. In the latter case the amount so charged will appear in both the revenue and the expenditure of the city and will correspondingly increase its budget. Neither the classification which includes nor that which excludes

such items can be said to be for all purposes the more correct; one will be more valuable for some purposes, the other for other purposes. Here again, therefore, the best way is not to exclude such items but so to state them that they may be distinguished, and hence may be included or excluded according to the requirements of the special purpose in view.

What has been said concerning "funds" applies to the sinking fund. Payments from the city treasury to the sinking fund are not expenditures but additions to the city's reserve, while payments from the sinking fund to the treasury are not portions of the city's revenue but drafts on its reserve. On the other hand payments from the sinking fund for the redemption of debt are a part of the city's expenditure, and the interest on the securities held in the sinking fund a part of the city's revenue.

For practical reasons, however, it seems best in this case to make an exception to the general principle and to treat the sinking fund as a separate account. The reasons for this may be stated as follows:

a. To state first a negative reason: the disadvantages (confusion and duplication) which would follow a general recognition of separate "funds" would not exist when we recognize only one such fund, since its relation to the accounts of the general treasury can be so stated as to make the facts perfectly clear.

b. A positive reason may be found in the fact that the practice of keeping such funds is practically universal in municipal finance, and the part which they play is so important that it is desirable to bring out clearly their relation as separate funds to the general finances of the city. So accustomed, indeed, have we become to thinking of the sinking fund as something separate from the

general treasury that any attempt to merge the accounts of the two would probably lead to confusion rather than clearness.

4. Receipts precisely alike in character are differently designated in different cities and expenditures precisely alike in character are assigned to different departments. Thus what is termed in one city a fee may be termed in another city a license, a tax, or an assessment. The cleaning of the streets or the removal of garbage may be in the hands of the street department, of the health department, of a separate department organized for the purpose, or divided between different departments. Great care should be taken to bring under the same heading all items alike in character, however they may be classified or designated in the accounts of the various cities.[1]

5. It is not possible to devise any single form of classification which may be termed correct in the sense of being the best for all purposes. Some classifications are best for some, others for other purposes. It would not be possible for the census to present all desirable forms of classification. It should, however, make so clear the content of the terms in the classification adopted, and present the facts in such detail that it will be possible to re-classify them in any way necessary to throw light on any question of municipal finance. In addition to its main classification, it should present only such re-classifications of its figures as will throw light upon certain facts of fundamental importance and general interest, and not involve an unreasonable expenditure of space

[1] Thus it is best to include under the heading franchise taxes all payments of the nature of special taxes made by companies in the enjoyment of public franchises, by whatever name such payments may be known.

and money. Correct presentation of the facts in detail in such a way as to make them available for any purpose should be the main object of the census.

6. Passing from these general considerations to the principles applicable to revenue as distinct from expenditure and vice versa, it is evident that the items of revenue should be classified according to the sources from which they are derived. We must distinguish between revenue from regular and constant sources, and revenue from sources necessarily irregular and limited, such as loans, sales or gifts. In the case of revenue from regular sources, we should distinguish between revenue which comes from the exercise of the taxing power, revenue which is incidental to the administrative activity of the city, and revenue which comes from the exercise of the penal power, from productive property, from quasi-private enterprises carried on by the city, or from payments to the city by other political and administrative bodies. In the case of revenue derived from taxation we should distinguish that which is assessed on citizens generally according to some estimate of their financial ability from that which is levied upon some particular form of business or property, or that which is assessed according to benefits received from some particular form of expenditure, or on account of the expense involved in some particular form of administrative oversight. It would probably not be possible to conform the classification of revenues strictly to the scheme required by the principles of finance, even if there were general agreement upon such a scheme among students of that science. A census classification to be of practical value must take into account facts of administrative and financial organization and practice, and the common usage of certain terms in certain senses, as well as the principles of

finance. It is necessary to effect a compromise between these two classes of considerations endeavoring always to conform as closely as possible to scientific principles.

7. Expenditures should be classified according to the purposes for which they are made. To do this to advantage it is necessary to follow concurrently two distinct principles of classification. According to the first, the determining factor is the character of the public need supplied, such as schools, streets or sewers. According to the second, the determining factor is the character of the expenditure as regularly recurring or special and exceptional. While such a distinction as the latter evidently exists and should be recognized, the exact line between the two kinds of expenditure is largely a matter of judgment and of the purpose in view. The terms usually employed to express it are "ordinary" and "extraordinary," but these terms, far from indicating the principle of classification adopted, must themselves be fully explained to serve any useful purpose. Without going into the discussion as to what constitutes ordinary and what extraordinary expenditure, a valuable and practical line of division may be drawn between expenditures for operation and maintenance (including salaries, wages, supplies and repairs) and expenditures for additions (including purchase of land, and purchase or construction of buildings and plants). Figures so classified for a series of years would show the average annual expenditures for additions and would thereby afford the most satisfactory basis for determining what portion of expenditures of this sort in any year is properly to be classified as ordinary and what portion as extraordinary.

The Schedules of the Tenth and Eleventh Censuses.— The tables of the tenth census dealing in detail with receipts and expenditures of cities are tables IV B and

IV C (7 : 234–261). The corresponding tables in the eleventh census are tables 12 and 14 in Wealth, Debt and Taxation, 2 : 554–557 and 560–599. The former relates to cities with population of 50,000 and over ; the latter to municipalities with a population of 4,000–50,000.

The tenth census was the first in which an attempt was made to show the receipts and expenditures of cities. The figures are given in detail for each city having a population of 7,500 or over.

From a careful comparison of these tables in the last two censuses, it is evident that the census of 1890 made a distinct advance over that of 1880. It shows the facts in greater detail, particularly on the side of receipts, and the grouping is better. The tenth census makes no attempt to draw any distinction between ordinary and extraordinary receipts, or to distinguish receipts which belong to the city from receipts in the collection of which the city acts only as agent. It does not even give any figure showing total receipts exclusive of balance from preceding year. In the eleventh census, on the the other hand, the receipts from regular sources of revenue and the expenditures for the work of city administration are grouped separately from transactions on account of debt, balances, and nominal items arising from transfers between funds.[1]

[1] Thus the only total given in the tenth census (7 : 240) for the receipts of New York in the table showing receipts in detail, is $68,460,286

In this total are included the following items :

Cash balance from preceding year	$ 2,260,743	
Proceeds of bonds sold	5,223,752	
Sinking fund	4,120,756	
Temporary loans	24,857,587	
	$36,462,838	36,462,838
Deducting this we have		$31,997,448

This figure, however, included taxes, to the amount probably of

Notwithstanding the advance made by the census of 1890, it still leaves much to be desired.[1]

The first point for criticism is the lack of a satisfactory explanatory text. In this respect indeed the census of 1890 is inferior to that of 1880. A similar fault is the lack of any precise definition of terms used. Thus there is no explanation of the heading, "funds, investments, transfers and refunds," which occurs under both receipts and expenditures in tables 12 and 14.[2]

about $4,000,000, collected for the state, deducting which would leave in round numbers $28,000,000 as the real revenue of the city, the figure needed for making comparisons with other cities in which the conditions in regard to cash balance carried, debt payment, and the issue of temporary loans in anticipation of revenue are different from those in New York.

That the above items were not properly a part of the revenue of the city may be seen from the statement of the following items taken from the table of expenditures (7 : 256,) :

Principal of bonded debt	$ 8,273,451
Temporary loans	25,744,342
Sinking fund	286,514
The balance at the end of the year is not given, but assuming that it is the same as at the beginning	2,260,743
The total would be	$36,565,050

According to the scheme followed in the eleventh census we find in the table of receipts two totals: "Gross receipts including balance", $101,854,775, and "Ordinary", $35,740,547; and in the table of expenditures, "Gross expenditures including balance", $101,854,775; "Ordinary", $37,218,857, which last is believed to include a double entry of about $3,500,000. (Wealth, Debt and Taxation 2 : 554-6.)

[1] The schedules of the eleventh census, although an improvement on those of the tenth census, are inferior to the schedules approved by the ninth *Congrès International de Statistique* and used by Körösi in his *Bulletin annuel des finances des grandes villes*, published for the years 1877–1886.

[2] 2 : 554–57 and 560–99.

The terms, "funds," and "investments," particularly need explanation. It is evidently not meant to include under these heads income from funds and investments since this item is separately stated under ordinary revenue. It would seem, therefore, that the terms are meant to include receipts from sales of property belonging to funds

The same is true of the item "funds" which occurs in the heading "income from funds and investments" under receipts. It is not clear, *e. g.*, whether the sinking fund is included under this head. Still another instance of the lack of exact information in regard to the meaning of the terms used is afforded by the heading "balance on hand beginning (end) of year." A comparison of the census figures with the reports of the financial officers of certain cities shows that the balances given by the former considerably exceed the balances in the treasury reported by the latter. The explanation apparently is that the census figures include not only the balance in the treasury but the cash balance in the hands of the sinking fund commissioners. Whether or no this practice is advisable, it is unusual and should be indicated, but neither the introductory text nor the footnotes, so far as the writer has been able to discover, afford any hint of it.

Turning to the form of the schedules we find in the case both of receipts and expenditures the greater part of the items grouped under the general heading "ordinary," preceding which are a number of items grouped under no general heading but included with "ordinary" receipts (expenditures) under "gross receipts (expenditures) including balance." These last named items taken together exceed, in the case both of receipts and expenditures, the ordinary receipts and expenditures, but (as explained below) neither they as a

and constituting investments, but this is not stated nor is there anything to indicate whether receipts from sales of securities only are included or from sales of productive real estate as well. Nor, again, is it stated whether receipts from sales are included when the proceeds are reinvested and the fund or investment kept intact, the sale being merely incident to a change in the form of investment and not resulting in any addition to the revenue for the year.

whole, nor the total which includes them, have any significance whatever. The use of the term "ordinary" implies the division of receipts and expenditures into ordinary and extraordinary. Accepting this principle of classification, it is clear that the items should be grouped under the following general headings:

RECEIPTS.	EXPENDITURES.
Balance at beginning of year.	Total expenditures.
Total receipts during year.	Ordinary.
Ordinary.	Extraordinary.
Extraordinary.	Balance at end of year.
Total of balance and receipts.	Total of expenditures and balance.

Not only does the census of 1890 give no figures showing extraordinory receipts and expenditures other than receipts from and expenditures for payment of loans, but it does not show total receipts or expenditures exclusive of balances at the beginning and end of the year. The figures which it gives for "gross receipts (expenditures) including balance" include, along with these items and inextricably confused with them, a mass of items, (such as taxes collected for state and county in the case of receipts, transfers between accounts and, apparently, moneys received and paid out incident to a change in the investments of city funds [1]) which are no part of those receipts and expenditures for purposes of city administration, which are what the census should show. Even on the basis of the system of classification adopted by the census for items other than "ordinary," there is an inconsistency between the schedules for receipts and expenditures, in that, while "collections

[1] There is of course no objection to giving the figures for these items, but they should not be included in a total intended to show municipal revenue and expenditure in any form. Revenue from loans and expenditure for payment of debt, however, form important parts of municipal revenue and expenditure and should be included in any total intended to show their gross amounts.

for state or county " are separately stated under receipts, the payments of these sums to the state or county are not separately stated under expenditures, but are included under some other heading, no indication being given as to which.[1]

In taking up the items grouped under ordinary receipts and expenditures we shall consider receipts and expenditures separately.

Receipts.—The main criticism to which the schedule is open is that it lacks sufficient detail. All sorts of quasi-private undertakings are grouped together under the heading "waterworks or other undertakings." It is, however, certainly both desirable and practicable to give separately the figures for such undertakings as water works, gas works, electric light works, conduits, etc.[2]

Special assessments for sidewalks are of sufficient importance to demand separate statement, and in the case of assessments for streets it is desirable to distinguish the main purposes for which assessments are levied, such as cost of land, construction, and maintenance and repair. There are licenses other than liquor licenses of sufficient importance, especially in the south, to be separately stated. The schedule contains no separate

[1] Apparently this item in the case of expenditures must be included under "funds, investments, transfers and refunds." The only other possible heading under which it could be included would be "miscellaneous," and in the case of many cities the sums entered under this head are too small to cover taxes collected for state and county.

[2] In justice to the census of 1890 it should be noted that this greater detail was much less important then than it is at the present time. The objection is rather to the use of the same schedule for 1900. It is not certain, indeed, that it would be wise to include such items as gas works, electric light works, and conduits in the general schedules for 1900; but if they should not occur with sufficient frequency to justify including them in the general schedule, the facts regarding them should be fully stated in foot-notes where they do occur. If we do not distinguish them from water works we destroy the possibility of getting at figures for water works as well as other enterprises.

headings for franchise taxes or receipts from productive real estate, both items of great interest, and in some cases of considerable importance,[1] and there is no indication of the headings under which these are included, although it seems probable that they are distributed among the headings, water works or other undertakings (net), licenses other than liquor licenses, fees, fines, and penalties, income from funds and investments, and miscellaneous.

Not only are the figures for water works and other undertakings given net, but the interest on bonds issued on account of such undertakings is included in their expenses.[2] There can be no doubt that this procedure is not only legitimate, but for certain purposes absolutely necessary; but it is equally certain that the schedules which give the receipts and expenditures in greatest detail should give all the items of revenue and expenditure without regard to the fact that the city may make a net profit or suffer a net loss in connection with certain enterprises. These tables should furnish full data, having which we can make the great variety of combinations necessary to throw light on the various phases of the problem of municipal finance and the

[1] The importance of these items in the case of New York may be seen by the following figures taken from the Comptroller's report for the census year (pp. 45, 55, 58):

Payments by street and other railway co.'s	$ 429,476
Market rents and fees	307,460
Ferry rent	330,345
Dock and slip rent	1,482,532
Street vaults	138,794
House rent	56,838
Ground rent	49,385

[2] See explanatory notes, Eleventh Census. Wealth, Debt and Taxation, 2 : 407.

relative financial condition of cities. This cannot be done by giving merely net results.[1]

Expenditures.—The use of the term "ordinary" is much more open to criticism than in its use in connection with receipts. Under this head all expenditures are included other than for "loans (principal)" and "funds, investments, transfers and refunds;" for example, all expenditures for addition to equipment. If a city should purchase an electric lighting plant, put in a system of sewerage or build a city hall, the cost according to the census classification would be included under ordinary expenditures. The vagueness of the terms "ordinary" and "extraordinary" in connection with expenditures has already been noted, but it is certainly not in accordance with any legitimate conception of the meaning of those terms to include such items as the above.

In the case of cities with a population of 50,000 or over it is possible to correct this fault so far as totals are concerned, the expenditure for "new buildings, works, sites, and grounds" being separately given, but it is stated that it was impossible to preserve the distinction in the case of cities with 4,000 but less than 50,000 inhabitants,[2] and such items are grouped with the "care and repair of public buildings." Even for cities with 50,000 or more population expenditures of this class are not distributed among the different departments in connection with which they are made. In the same way,

[1] Further, the "net" results as calculated in the census do not afford a satisfactory basis for estimating the real financial results achieved by cities in managing such enterprises, since no account is taken of depreciation. It was of course impossible to allow for such an item as this in the schedules of receipts and expenditures, an impossibility which goes to show the unwisdom of trying to show net results in such tables.

[2] *Idem*, 2 : 407.

the item of "salaries separately reported" seems unnecessarily large. Still another item open to criticism is that "the amount of interest paid on bonds issued by any city and held in the sinking fund is treated only as a transfer between accounts, and the interest payment correspondingly diminished."[1]

As a result of this practice, and that of including in the expenses of water works and other undertakings interest on the bonds issued in connection with such undertakings and then giving only the net results, it is impossible to determine the total expenditure for interest on bonded debt, a fact of considerable importance in municipal finance. It is certainly most remarkable that neither in the tables of receipts and expenditures nor in the hundreds of pages devoted to the statistics of municipal indebtedness, is there a figure which shows the expenditure for interest by a single city.

Like the schedule of receipts, the schedule of expenditures is open to the criticism that the classification is not sufficiently detailed. It is not necessary to specify the directions in which it might be advantageously expanded. This will be evident from a comparison of the tables employed in the census with the schedules suggested in appendix III.

Suggested schedules.—As already stated the schedules in the appendices are intended as suggestions subject to alteration in detail as the facts when collected may show to be desirable. They are prepared, moreover, with special reference to the larger cities. While preserving the same general scheme it would probably prove advisable to omit much of the detail in the case of the smaller cities.[2] It is believed that the facts presented in accord-

[1] *Ibid.*

[2] It is not claimed that the receipts and expenditures of all even of

ance with these schedules (I and II in appendix III) would constitute a contribution of real value to the study of municipal finance.

Schedules I *a* and II *a* give a recapitulation of the main classes of receipts and expenditures in such a way as to make allowance for items somewhat exceptional in character and to render possible comparisons on several distinct bases. Schedule III shows in their relation to each other the main facts of revenue and expenditure. Schedule IV shows revenue and expenditure for certain departments which yield considerable revenue, although the obtaining of revenue is not the primary purpose for which they are administered, or which are largely supported by special taxes, fees, etc.

Schedule V shows the receipts and expenditures of the sinking funds. As, under the plan proposed, the sinking fund accounts are not combined with those of the general treasury, this separate presentation is necessary. Schedule VI shows for total receipts and expenditures, the result of combining the sinking fund and general treasury accounts.

It would be highly desirable to present the figures for the receipts and expenditures of the larger cities for the intercensal years. The detail involved, however, is so much greater than in other branches that it is doubtful whether such a presentation would be practicable.

No schedules are suggested for municipalities other than cities. The reason of this is the desire to save space. If the schedules suggested for cities were adopted,

the larger cities can be classified with the detail called for by the schedules. This may be impossible for many cities. For the majority of the larger cities the details can be given and the value of the tables correspondingly increased. Further, the general scheme being the same, the greater or less detail in the figures for different cities will not destroy the basis of comparison between them.

it would be a comparatively easy matter to prepare schedules for other municipalities which should be comparable and capable of combination with the former.

It will be noticed that the schedules proposed make no provision for presenting the figures of revenue and expenditure in a single schedule in which each department of administration is charged with the expenditure incurred and credited with the revenue received in connection with it. This is done by some European and American cities, and is recommended by some writers who speak with authority.[1] In the opinion of the writer, however, such a practice tends to confuse and mislead rather than inform. The principles of classification for revenue and for expenditure are radically different. Revenue should be classified according to the source from which it is received, expenditure according to the purpose for which it is made. These two principles of classification cannot be combined in a single schedule, and any attempt to do so which results in anything else than a mere repetition of the tables of revenue and expenditures, is certain to lead in many instances to arbitrary and misleading classification of revenue or expenditure or both. The usual plan when such an attempt is made is to use a composite schedule corresponding more closely to the expenditure than to the revenue schedule. In this, expenditures are classified in practically the same way as in the separate expenditure schedule, but in the case of revenue what is regularly appropriated to meet the expenditure of any department of the city government is credited to it regardless of the nature of the relation which exists between the revenue so appropriated and the department. The relation may exist

[1] See "Suggestions for the Study of Municipal Finance" by Fred. R. Clow in *Quarterly Journal of Economics*, July, 1896.

merely in the act of appropriation (*e. g.*, the revenue from dog licenses may be appropriated to school purposes) or in the fact that the revenue is raised for the special purpose of meeting the expense of a department (*e. g.*, sewer assessments) or in the fact that the revenue is the direct result of the work of the department (*e. g.*, receipts from sale of water or gas). Revenue not regularly appropriated to specific purposes is usually stated separately according to the source from which it is derived, the classification of the revenue schedule being to this extent introduced into the composite schedule. The results of such a schedule are apt to be as follows :

1. A great amount of repetition provided separate schedules are also used.

2. Arbitrary and misleading classification of certain revenues. Not only is revenue credited to departments with which it has no real connection, but revenue from like sources may be credited to different departments in different cities, and even different portions of revenue from the same source to different departments in the same city, according to the chances of appropriation acts.

3. A considerable amount of valuable information in regard to the relative revenue and expenditure of a number of departments which yield a revenue or are supported by special taxes levied for the department.

It is possible to give the information mentioned under 3 without combining with it the repetition and misleading classification mentioned under 1 and 2. Provision for such a presentation is made in appendix III, schedule IV.

Another omission which may seem to many important, is the failure to provide for a complete statement of municipal assets and liabilities in connection with the figures for receipts and expenditures. It seems to the

writer, however, that when the statement of assets is extended to property (*e. g.*, streets and sewers) which yields no income, which is never bought or sold, and to which, therefore, no market value can be assigned, the estimates placed on such property are apt to be misleading and must necessarily be so arbitrary as to be of little value. Provision for a statement of assets to which a market value can be fairly assigned, and of liabilities, is made in schedule II, appendix II, and there would seem to be no need of repeating it in connection with the schedules of receipts and expenditures.

The criticisms of the last census and the suggestions made in this report have had reference to the methods of classification adopted rather than to the accuracy of the figures. There are two reasons for this: 1. There is no suggestion to make in regard to accuracy. It must be attained if the work is to be of value. 2. One of the most serious criticisms on the classification followed is that it makes it impossible to determine whether the figures are accurate. The writer has no reason to doubt the substantial accuracy of the census figures although some errors have come to his notice, *e. g.*, in the case of Rhode Island, under the heading "Collections for state and county separately reported," figures are given for Providence (2: 554,576) and for Bristol and Cumberland, but not for the other towns. All the towns, however, made such collections, and it would have been easy to find the amount.

The attainment of accuracy is dependent on the administration of the census work, suggestions in regard to which do not fall within the scope of this report.

V.

FINAL CONSIDERATIONS.

There is a question which, while it does not, perhaps, properly fall within the scope of this report, is so essential to a correct estimate of the importance of municipal finance that it seems to demand consideration here. To estimate aright the importance of municipal finance as an element in the financial system of the country as a whole, we must study it not merely by itself but in connection with the finances of the county, the state, and the nation. Between the finances of the municipality, the county, and the state, there is sufficient unity to make advisable a statement showing their combined results, and it is of great importance that the schedule employed for this purpose should be such as to show the facts in their true relations to each other. Unfortunately the eleventh census is even more open to criticism in regard to the manner in which this part of the work was done than in its presentation of the facts of municipal finance separately.

The worst faults are to be found in the table showing the combined results for receipts and expenditures.[1]

Bringing the summaries for receipts and expenditures as presented in the table on page 449 into comparison with each other we have the result there shown.

It is evident at a glance that the classification adopted is confusing and misleading. The figures for receipts and expenditures do not apply to the same bodies throughout. Thus no expenditures are given for the bodies for which receipts are given in column 6 and no receipts are given for the bodies for which the expenditures are given in columns 7 and 8. In other cases, the figures for expenditure do not include the whole ex-

[1] Wealth, Debt and Taxation, 2 : 410-411.

1	2	3	4	5	6	7	8
Total.	State.	Counties reported in detail.	Municipalities having 50,000 or more population and reported in detail.	Municipalities having less than 50,000 but 4,000 or more population and reported in detail.	Additional estimated for public common schools and places not reported in detail.	School districts or other divisions in charge of public common schools.	Additional estimated for places not reported in detail.
RECEIPTS.							
$584,835,526	$116,157,640	$80,176,436	$181,860,083	$61,670,758	$144,970,609		
EXPENDITURES.							
			Except for public schools	Except for public schools			
$569,252,634	$77,105,911	$68,479,220	$155,356,212	$57,442,844		$139,065,537	$71,802,910

penditure made from the revenue with which the expenditure is brought into comparison, the result being a large apparent surplus. Thus in the states the figures for receipts include some thirty-six million dollars collected and paid over to minor divisions, but in the figures for expenditures this item is omitted, being trans-

ferred to column 7. In the same way the figures for the receipts of municipalities with 50,000 population and over include $30,942,042, and the figures for the receipts of municipalities with 4000–50,000, $10,853,822, which is omitted in the figures for the expenditures for the same municipalities, and is transferred to column 7. Whether or not it is desirable to treat school finances separately, the mixture of two principles of classification in the same table can yield nothing but confusion. If the expenditures for schools were to be treated separately, the same principle should have been followed in the case of receipts.

The same classification is followed in table 8[1], which shows "ordinary receipts and expenditures of states and territories, counties, municipalities and school districts by classification of sources and objects." Even aside from the faults just pointed out, the table of which the summary is given above is not satisfactory, since only the absolute amounts of the receipts and expenditures for each state, and not the per capita amounts, are given. Thus comparing the receipts of the states, counties and municipalities in Massachusetts and Indiana, we have the following figures:

	State.	County.	Municipalities having 50,000 or more population.	Municipalities having less than 50,000 but 4,000 or more population.
Massachusetts	$9,666,333	$1,644,402	$18,978,020	$12,914,367
Indiana	3,360,876	7,505,318	1,127,983	1,436,717

Since the county organization includes the whole population in each state, the table shows clearly that people in Indiana pay on the average for their county government as compared with their state government about fifteen times as much as the people of Massachusetts. Comparing the receipts of the state and munici-

[1] *Idem*, 420–451.

palities in the two states, we find that in Massachusetts the receipts of the municipalities are about three and one-third times as great as the receipts of state, while in Indiana the receipts of the state are about one and one-third times as great as the receipts of municipalities. These figures, however, throw no light whatever on the important question, Do the dwellers in cities in Massachusetts pay more or less than the dwellers in the cities in Indiana for their city government as compared with their state government? The relatively large receipts of municipalities in Massachusetts may indicate that they do but, on the other hand, it may indicate simply that a much larger portion of the population of Massachusetts live in cities than is the case in Indiana. The census figures give us no help in determining which of these conditions is the true explanation of the great difference in the relative importance of state and municipal revenue in the two states. The same is true of table 5,[1] which gives the total ad valorem taxation for the state, counties and municipalities in each state, and of the table[2] which gives a summary of state, county and municipal indebtedness by states. The only way of overcoming the difficulty stated is to give for each group of administrative divisions the population included within the group and the per capita as well as the absolute amount of valuation, taxation, receipts, expenditures and indebtedness.

The nearest approach in the census to a satisfactory presentation of figures for the different sorts of administrative bodies in a single table is made in the table showing "the national, state, and classes of the local bonded debt of the United States, and the amount, aver-

[1] *Idem*, 2 : 102.
[2] *Idem*, 1 : 77–78.

age interest rate, and per capita interest charged thereon for 1890." [1]

Aside from the changes in the classification of municipalities suggested in this report, the grouping of the different political and administrative divisions in this table would be entirely satisfactory, if there were introduced before the first column two columns showing respectively the population of each group of administrative bodies and the percentage of the total population of the state included within the area of each. The same principle should, of course, be applied to all tables in which the figures for different administrative divisions are combined.

A final question remains: the question whether it is advisable to extend or even to retain the statistics of state and local finance, as a part of the census work.

Since the tables proposed in the appendices to this report are more detailed than the corresponding tables used in the eleventh census, it will appear at first sight that the substitution of the proposed schedules will involve a considerable increase of space. The increase due to this change might, however, be largely if not wholly offset by the omission of much matter of small value published in the finance statistics of the last census.[2] As regards the advisability of continuing the work even though no considerable increase of cost and space be required, there is general agreement among those who have given attention to the subject that the last two censuses have attempted to cover too wide a field, and that while it is possible that certain branches of census work may be profitably extended, other

[1] *Idem*, 1: 857.

[2] It must be remembered that it is proposed to treat in greater detail only the larger cities, and even to group the smaller places, the figures for which occupy the greater part of the space in the last census.

branches should be greatly curtailed, or entirely cut off. It is further felt that it would be a distinct gain if the net result of these changes were a marked decrease in the bulk of the census. Although there are good grounds for these views, yet unless provision is made for carrying on the work in some better way it hardly seems advisable for the census even though its organization remain unchanged,[1] to drop a portion of its work which deals with a matter of great and increasing importance, which has been carried on by two previous censuses, and which, although open to serious criticism, has yielded results of much value, and is susceptible of very great improvement. Such provision for a portion of the work seems probable. By an act passed at a recent session of Congress the Department of Labor is authorized to publish annually, as a part of its Bulletin, the statistics of cities with a population of 30,000 or over. The Department of Labor is better fitted than the census will probably be to do this work efficiently, and if it undertakes the presentation of finance statistics of the larger cities, the census should certainly not attempt to duplicate its work. Unless, however, the work of the Department of Labor is extended beyond the limits above defined, it will still remain for the census to present the statistics of the finances of states, counties, the smaller municipalities and the special districts, as well as the statistics of state and local finance as a whole. This is essential for the understanding not merely of public finance in this country, but of municipal finance itself, since existing conditions and changes in the latter can-

[1] This point should be emphasized. There is nothing in the character of the statistics of public finance which prevents their successful treatment by the census.

not be intelligently interpreted without a knowledge of the accompanying conditions and changes in the finances of other political and administrative bodies of which the municipality forms a part.

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APPENDIX I.[1]

SUMMARY.

Population.

Valuation and ad valorem taxation.

Assessed valuation — real estate; personal property; total; per capita.

*True valuation of real estate—taxed; exempt; total; per capita.

Ad valorem taxation—total; per capita; rate per $100 of assessed valuation; rate per $100 of real estate (true valuation).

Debt.

Bonded; floating; total; net (total less sinking fund). Per cent of assessed valuation—a. gross debt; b. net debt. *Per cent of true valuation of real estate—a. gross debt; b. net debt.

Receipts and expenditures.

Receipts, *from ordinary sources—a. total; b. per capita; from all sources (including, however, only excess of receipts from loans and sinking funds over expenditures for same purposes)—a. total; b. per capita.

Expenditures, for operation and maintenance (1900)—a. total; b. per capita; for additions to real estate and equipment (1900)—a. total; b. per capita; for interest on debt—a. bonded (1880, 1900); b. floating (1900); c. total (1900); for all purposes (including, however, only excess of payments on account of principal of debt and sinking funds over receipts from same sources)—a. total; b. per capita.

APPENDIX II.[2]

SCHEDULE I.—DEBT MOVEMENT 1890–1900.

At beginning of year.

Gross bonded debt; sinking fund; net bonded debt, *i.e.*, gross bonded debt less sinking fund; gross floating debt; cash in treasury; net floating debt, *i.e.*, gross floating debt less cash in treasury; total gross debt, bonded and floating; total net debt, bonded and floating.

[1] When not otherwise specified, figures should be given for each of the years 1880, 1890 and 1900. An asterisk indicates that it would probably be impossible to give the figures for 1880. There should be four columns, one for the amount and three for the per cent of increase, 1880–1890, 1890–1900 and 1880–1900 respectively.

[2] The figures for the following items should be given for each of the intercensal years, 1890–1900 inclusive.

During year.

Bonds issued—a. in anticipation of current revenue; b. other; bonds paid or purchased—a. bonds issued in anticipation of current revenue; b. other; floating debt incurred; floating debt paid.

SCHEDULE II.—DETAILED STATEMENT OF DEBT AND ASSETS.

Debt.

Bonded; floating; total.

Productive and available assets.

1. Cash in treasury.

2. Productive assets. a. Sinking funds—cash; bonds of the city itself; bonds of other cities; bonds of the United States; bonds of states; bonds of other public bodies; other securities. b. Other funds—securities; real estate; other property. c. Quasi-private enterprises—real estate; plant; other assets. d. Other productive property—securities; real estate; other.

3. Available but non-productive assets—a. real estate; b. other.

4. Total productive and available assets.

Comparison between debt and assets.

1. Bonded debt less sinking funds—amount; per capita.

2. Bonded debt less productive and available assets—amount; per capita.

3. Bonded and floating debt less sinking funds and cash in treasury—amount; per capita.

4. Bonded and floating debt less productive and available assets—amount; per capita.

5. Interest on bonded debt.

6. Income from productive assets (net[1]).

7. Proportion of net income from productive assets to interest on bonded debt—per cent.

8. Proportion of net income from productive assets (other than sinking funds) to interest on bonded debt—per cent.

APPENDIX III.

SCHEDULE I.—SOURCES OF REVENUE.

Explanatory note.

As already stated, the purpose of this schedule is to suggest an approximately satisfactory scheme for the classification of revenues. It

[1] Gross income less expenditures for operation, care and maintenance, sinking fund charges and allowance for depreciation.

is intended to show the main classes into which revenues may be advantageously divided and the character of the items which should be grouped under each class. If the attempt were made to use the schedule for census work it would doubtless prove advantageous to condense it, perhaps by one-half. Many items might be found to occur so infrequently that it would be advisable to treat them in foot-notes rather than to include them in the general schedule. It is believed, however, that the schedule contains no items for which it would not be well to give the figures separately (either in the schedule itself or in foot-notes) when the items occur and a separate statement is possible. Indeed, a complete examination of city finances would doubtless disclose many items not included in this schedule for which a separate statement would be desirable. Just the points at which, and the extent to which, the schedule could be advantageously condensed can be determined only by experience.

It is intended that in its main features it should be as near an approach to scientific requirements as it is practicable to make. Class V would probable be most open to criticism on scientific grounds. Many items included in this class should doubtless, in accordance with scientific principles, be classed as fees, since the character of a payment as a fee is, by those who speak with most authority on the subject, made to depend not so much on the character of the service as on the relation between the cost of the service and the amount paid for it. This method of determining whether or not a payment is a fee would be very difficult to follow in census work, and it has seemed best, therefore, to apply the term fee to payments for services rendered or in accordance with conditions imposed, in which the element of compulsion by the city over the individual is strong. Payments for those services or goods which the individual is, in theory at least, free to accept or decline are included in Class V. This principle of classification, while not entirely free from ambiguity, is relatively easy to apply.

The significance and application of the separate statement of sums paid by other political and administrative bodies, and of sums paid by one branch of the city administration for services rendered by other branches, may be seen by reference to Schedule I a. In the case of the former the figures have a direct bearing on the figures of the schedule in which the facts are given for the states, counties and minor divisions together.

Schedule.

There should be separate columns showing the actual and per capita revenue and the per cent that each item of revenue is of the revenue from the next higher or more general class. For this purpose the main divisions I-VIII are treated as direct sub-divisions of IX and main divisions IX, X, XI, XII, XIII, XIV, XV, direct subdivisions of XVI.

Balance on hand at beginning of year.

Revenue from:

I. *Taxation.*

1. General property tax; 2. taxes on special forms of property; 3. poll taxes; 4. taxes on trades and occupations (exclusive of taxes on companies in possession of public franchises); a. liquor trade; b. tobacco trade; c. other trades; d. occupations other than trades. 5. franchise taxes—a. street railway companies; b. ferry companies; c. water companies; d. gas companies; e. electric light and power companies; f. telephone companies; g. other companies. 6. fees—a. court fees; police courts; other courts; b. other fees such as those from inspection of buildings, boilers, plumbing, etc. 7. special assessments—a. streets; acquisition of land; opening and building; maintaining and repairing; b. sidewalks and curbing; c. sewers; d. bridges; e. other. 8. other taxes.

II. *Penalties.*

1. Fines and penalties assessed by courts—a. police courts; b. other courts. 2. Other penalties.

III. *Rents.*

1. Docks and wharves; 2. ferries; 3. markets; 4. conduits; 5. other improved real estate; 6. unimproved real estate.

IV. *Investments other than real estate* (exclusive of sinking funds).

1. School funds; 2. other funds.

V. *Services rendered and goods sold by city.*[1]

1. Penal institutions—a. prisons and jails (from industries carried on by inmates; from other political and administrative bodies), and similarly for workhouses, reformatories, and other institutions. 2. institutions for the care of the needy and dependent classes—a. hospitals (from other political and administrative bodies); b. asylums; (from other political and administrative bodies); c. lodging houses; d. wood yards, stone yards, etc.; from city itself; e. laundries; from city itself; f. other institutions. 3. parks; 4. cemeteries; 5. quasi-private enterprises—a. water, (from city itself); b. gas, (from city itself); c. electric light and power, (from city itself); d. conduits, (from city itself); e. ferries; f. docks and wharves; g. printing, (from city itself); 6. other.

VI. *Interest.*

1. Deposits; 2. other.

VII. *Grants from other political and administrative bodies* (exclusive of payments for services rendered and goods furnished by city).

1. From state; for schools; for other purposes; 2. from county; for schools; for other purposes; 3. from other bodies; for schools; for other purposes.

[1] Items in parenthesis should be separately stated, but do not form a complete subdivision.

VIII. *Other revenue not of an extraordinary character.*

IX. TOTAL REVENUE FROM ORDINARY[1] SOURCES.

X. *Sales* (other than those included under previous headings),

1. Real estate; 2. other.

XI. *Donations* (exclusive of grants included under VI).

XII. *Other revenue not included in VIII, XIV, or XV.*

XIII. TOTAL REVENUE FROM SOURCES OTHER THAN LOANS AND WITHDRAWALS FROM SINKING FUNDS.

XIV. *Loans.*

1. Sales of bonds including premiums and interest received; 2. other.

XV. *Transfers from sinking fund.*

XVI. TOTAL REVENUE FROM ALL SOURCES.

XVII. TOTAL RESOURCES (total revenue plus balance at beginning of year).

SCHEDULE I a.

(Both actual and per capita figures should be given.)

A. RESTATEMENTS OF REVENUE FROM ORDINARY SOURCES.

I. Revenue from ordinary sources (IX above).

II. Revenue as in I, less revenue received from other political and administrative bodies.

III. Revenue as in II, less refunds (Schedule II, Class IX).

IV. Revenue as in III, less revenue from quasi-private enterprises due to payments by the city itself for services rendered by such enterprises.

V. Revenue as in IV, less other revenue from quasi-private enterprises.

B. NET REVENUE FROM LOANS AND TRANSFERS FROM SINKING FUNDS.

Excess of revenue from loans and transfers from sinking funds over debt paid and transfers to sinking funds.

[1] The term "ordinary" is employed here not in any scientific sense, but solely with reference to actual conditions in the different cities referred to. "Ordinary" revenue is revenue from sources which may be regarded as regular or permanent.

SCHEDULE II.—EXPENDITURES.

Explanatory note.

The statements made in the first half of the explanatory note in connection with Schedule I apply *mutatis mutandis* to Schedule II. In practice it would probably prove advisable to condense the schedule, possibly combining certain items[1] and placing in foot-notes certain others of infrequent occurrence.

The term "unclassified" as here used is intended to include expenditures for two or more of the purposes, in the same general class with the unclassified expenditures, which expenditures, being of such a character that it is impossible to distribute them, cannot be assigned to the purposes in question. Thus if a commissioner of public works has charge of streets, sewers, bridges and water-works, his salary and general office expenses should properly be distributed among the expenditures for the purposes mentioned. This, however, being impossible the amount is entered in the proper general class of expenditures as "unclassified," the figures following indicating the divisions within the class among which the unclassified expenditure would be distributed if possible.

The use of the terms "operation and maintenance" and "additions to real estate and equipment" is explained on page 435 of this volume.

Schedule.

PURPOSES OF EXPENDITURE.

There should be separate columns showing 1. Expenditures for operation and maintenance; 2. expenditures for additions to real estate and equipment; 3. total expenditures. Columns 1 and 3 should be subdivided so as to show actual and per capita amounts and the per cent which each item constitutes of the item of which it is a direct subdivision. In column 1, main classes I, II, etc., should be treated as subdivisions of the total for that column, and this total as a subdivision of the total for XII in column 3. In column 3, main classes I–XI should be treated as subdivisions of XII and main classes XII–XIV as subdivisions of XV.

I. *General government.*

1. General executive officers—mayor; other; 2. legislative (city council, clerk, etc.); 3. elections (including boards of canvassers and elections); 4. buildings (exclusive of those belonging to departments specified below); 5. unclassified (1, 2, 3, 4); 6. other purposes in class I.

[1] It is believed, however, that there are few items which should not be separately stated either in the schedule or in foot-notes when they occur.

II. *Financial system.*

1. Treasurer; 2. auditor (comptroller); 3. assessment of taxes (boards of assessment, equalization, etc.); 4. collection of taxes; 5. management of debt and sinking fund; 6. unclassified; 7. other purposes in class II.

III. *Security of person and property, and enforcement of law.*

Parentheses indicate that the items enclosed should be specified when they occur.

1. Police department; 2. fire department; 3. inspection of buildings; 4. inspection of boilers; 5. law department; 6. courts: police court; other courts; 7. penal and reformatory institutions—prisons and jails, industries carried on by inmates; workhouse, (industries carried on by inmates); reformatories, (industries carried on by inmates); other institutions; unclassified; 8. unclassified; 9. other purposes in class III.

IV. *Well being and convenience* (other than education and allied purposes).

1. Health—a. general expenses of health department; b. inspection of food; c. inspection of plumbing; d. removal and disposal of garbage; 2. sewers; 3. means of communication—a. streets (other than street cleaning); b. street cleaning; c. bridges; d. rivers and harbors; e. docks and wharves; f. ferries; 4. light and power—gas,[1] electric[1], other[1]; 5. water[1]; 6. markets; 7. conduits; 8. parks, recreation grounds and piers; 9. public baths and comfort stations; 10. regulation of certain kinds of traffic—a. liquor traffic; b. other; 11. employment bureau; 12. unclassified; 13. other purposes in class IV.

V. *Education and allied purposes.*

1. Schools—2. libraries and reading rooms; 3. museums and art galleries; 4. monuments; 5. historical documents; 6. celebrations, music, etc.; 7. unclassified; 8. other purposes in class V.

VI. *Needy and dependent classes.*

1. Hospitals; 2. asylums; 3. almshouses; 4. wood-yards, stone-yards, etc.; 5. laundries; 6. lodging houses; 7. out relief; 8. unclassified; 9. other purposes in class VI.

VII. *Interest.*

1. Bonded debt; 2. floating debt.

VIII. *Additions to funds* (other than sinking funds) *and productive property* (other than that included under IV, 3–7).

IX. *Refunds.*

X. *Unclassified.*

XI. *Other purposes* (except payment of debt and transfers to sinking funds).

[1] When the expenditures for these purposes are expenditures for enterprises owned and managed by the city, the fact should be indicated by printing the figures in italics.

XII. TOTAL OF CLASSES I–XI.

XIII. *Payment (including purchase) of debt.*

1. Bonded debt (including premium on bonds purchased); 2. floating debt.

XIV. *Payments to sinking fund.*

XV. TOTAL EXPENDITURES FOR ALL PURPOSES.

XVI. *Balance on hand at end of year.*

XVII. TOTAL, INCLUDING BALANCE.

SCHEDULE II a.

(*Both actual and per capita figures should be given.*)

A. RESTATEMENTS OF EXPENDITURES FOR OPERATION AND MAINTENANCE.

I. Expenditures for operation and maintenance (Schedule II).
II. Expenditures as in I, less expenditures on account of other political and administrative bodies as measured by payments received from them. (See Schedule I a.)
III. Expenditures as in II, less refunds. (Schedule II, IX.)
IV. Expenditures as in III, less expenditures for services rendered and goods supplied by departments of the city itself.
V. Expenditures as in III, less expenditures for operation and maintenance of quasi-private enterprises.

B. NET EXPENDITURES FOR DEBT AND SINKING FUND.

Excess of expenditures for payment (or purchase) of debt and transfers to sinking fund over receipts from loans and transfers from sinking fund.

SCHEDULE III.—REVENUE AND EXPENDITURE COMPARED.

I. Revenue from ordinary sources (Schedule I, IX).
II. Expenditures for purposes other than the payment of debt and transfers to sinking funds (Schedule II, XII). a. Operation and maintenance; b. addition to real estate and equipment.
III. Excess of I over II.
IV. Excess of II over I.
V. Excess of I over IIa.
VI. Excess of IIa over I.
VII. Revenue from all sources other than loans and withdrawals from sinking funds (Schedule I, XIII).

VIII. Excess of VII over II.
IX. Excess of II over VII.
X. Excess of VII over IIa.
XI. Excess of IIa over VII.

SCHEDULE IV.—COMPARISON OF EXPENDITURES FOR CERTAIN PURPOSES WITH REVENUE FROM SPECIAL SOURCES AVAILABLE FOR SUCH PURPOSES.

Explanatory note.

Under "revenue from special sources" are included for each department of expenditure, special taxes levied to meet its needs; fees, fines, costs, payments for services rendered, goods supplied and privileges granted, and all other receipts incident to its administration; rent of real estate and income from funds belonging to it or held for its use; and regular grants in its favor from other political and administrative bodies. The following classes of revenue are not included.

1. Gifts or special grants by other political or administrative bodies; 2. income from sales of property which involve a diminution in the real estate or equipment of the department in question; 3. revenue which in its origin has no relation to the department in question, but which is by law appropriated to its uses, *e. g.*, revenue from a tax on dogs, or the sale of liquor, or the franchise of a street railway company, although appropriated to the use of schools, would not be included in the revenue of schools from special sources as here given.

In estimating "expenditures for operation and maintenance" there is added to expenditure, as given in Schedule II, the interest and sinking fund payments on account of any debt incurred in connection with the department in question, and in the case of productive improved real estate, and quasi-private enterprises, an allowance for depreciation, unless the facts show that the expenditures for repairs, included in the expenditures for maintenance, really cover that item.

As in the case of Schedules I and II, it would probably prove to be advisable to omit from the general schedule certain items here specified, stating the facts in foot-notes when necessary.

Schedule.

There should be separate columns showing 1. Revenue from special sources; 2. Expenditures for operation and maintenance; 3. Excess of 1 over 2 or 2 over 1; 4. Percentage of 1 to 2.

DEPARTMENTS OF EXPENDITURE.

Courts.

Police; probate; other.

Penal institutions.

Prisons and jails; workhouses; reformatories; other institutions.

Institutions for the care of the needy and dependent classes.

Hospitals; asylums; almshouses; wood-yards, stone-yards, etc.; laundries; lodging-houses; other institutions.

Employment bureau.

Streets.

Bridges.

Rivers and harbors.

Sewers.

Parks.

Street cleaning.

Removal of garbage.

Productive real estate and quasi-private enterprises.

Water supply; gas supply; electric light and power; wharves and docks; ferries; conduits; markets; other improved real estate.

SCHEDULE V.—REVENUE AND EXPENDITURE OF SINKING FUNDS.

On hand at beginning of year.

Cash; securities.

I. *Revenue.*

1. From general treasury (not including payment of interest on city debt held in the sinking fund).
2. Interest and dividends on securities. a. Interest on city debt held in sinking funds; b. interest on securities of other political and administrative bodies within the country; c. other dividends and interest.

II. *Expenditure.*

1. Payments to general treasury.
2. Debt paid or purchased (including premiums) without intervention of general treasury.
3. Other purposes.

On hand at end of year.

Cash; securities.

SCHEDULE VI.—COMBINED STATEMENT OF TOTAL AND PER CAPITA REVENUE AND EXPENDITURE OF GENERAL, TREASURY AND SINKING FUNDS.

BALANCE ON HAND AT BEGINNING OF YEAR.

General treasury (see Schedule I).

Sinking funds (see Schedule V).

REVENUE.

1. *From sources other than loans and transfers from sinking funds.*
   a. General treasury (Schedule I, XIII).
   b. Sinking funds.
      Total revenue (Schedule V, I); less receipts from general treasury (including interest on debt), (Schedule V, I, 1, and V, I, 2, a).
2. *From loans* (Schedules I, xiv).

EXPENDITURE.

1. *For purposes other than payment and purchase of debt and transfers to sinking fund.*
   a. General treasury; expenditure as given in Schedule II, XII; less interest on debt held in sinking fund.
   b. Sinking funds; expenditure as given in Schedule V, II, 3.
2. *Expenditure for payment and purchase of debt.*
   a. General treasury (Schedule II, XIII).
   b. Sinking funds (Schedule V, II, 2).

BALANCE AT END OF YEAR.

General treasury (Schedule I).

Sinking funds (Schedule V).

The Scope and Method of the Federal Census.

The Federal census of to-day presents many difficulties with respect to the enumeration, tabulation and presentation of the varied data comprehended in the law by which it is now governed, and in undertaking to consider its scope and method, as at present outlined, it is impossible for any one who has had any practical experience in census work, and particularly in connection with the work of the United States census at either of the last two enumerations, to refrain from finding fault, at the very outset, with the temporary nature of the system under which it is taken.

At the earlier enumerations there was not much reason for making any special or permanent provisions for carrying on the census work, involving, as it did up to 1850, nothing more than a simple enumeration of the number of persons in each family according to their color, sex and age, with the addition from time to time of a few other details; so that the conditions that prevailed then, and the results to be attained, did not warrant any preparation beyond the temporary provisions which were made for the work at each decennial period. But, commencing with 1850, the method and scope of the census were materially modified, and it comprehended at that and the two succeeding enumerations not only a detailed statement of the name, age, sex, color, nativity, occupation, education and physical and mental condition of each person enumerated, but, in addition, very nearly one hundred inquiries relating to agriculture, industry, mortality, schools, libraries, churches, newspapers and periodicals, and the valuation and taxation of property.

This extension of the scope and change in the methods, but not the machinery, of the census (the marshals and assistant marshals being still employed, as theretofore, to make the enumeration), necessitated the organization of a Census Office in the Department of the Interior at Washington, from which the work of the enumeration could be supervised and directed, and to which the returns, when completed, could be sent for tabulation and presentation. Theretofore the law had required that abstracts, showing for the various civil divisions the number of each class of persons called for by the census act, should be made by the marshals from the original returns and forwarded to the Secretary of State, for publication in practically the same form as transmitted by them. There was no necessity, therefore, prior to 1850 for a separate office at Washington to which should be given the supervision of the census, but when the scope of the decennial enumeration was broadened so as to cover many subjects and to include many particulars, and the duty of compiling the returns was taken from the marshals and charged upon the authorities at Washington, the need of an office with a superintending head to have direct control of the work was recognized by Congress, and provision was made by the law of 1850 for the appointment of a superintendent of the census, and, in effect, the establishment of a temporary Census Office.

This office was called into existence at the commencement of the enumeration (June 1) in 1850 and 1860 and a few months prior to the enumeration in 1870, and was disbanded upon the substantial completion of the work at each census period. Between 1860 and 1870, however, a clerk was retained in charge of the census records, while between 1870 and 1880 there was not

only a clerk retained, in the person of the former chief clerk of the census office, but, in addition, General Walker, who had been the superintendent of the ninth census, by request of the Secretary of the Interior continued to serve in that capacity without pay and was, therefore, in official charge of census matters and was consulted with respect to the legislation which so radically changed the method of taking the tenth census and expanded its scope beyond all precedent. So, while the census was still taken under a temporary system, the threads of the census organization at the ninth census were not lost in any essential particular, and some of the experience gained and precedents established at that census were available and could be utilized, if need be, in the work of the tenth census, taken under the superintendence of General Walker, and in accordance with the general features of the plan recommended and advocated by him for making it, following the popular sentiment of the times, a centennial census.

The unfortunate conditions attending the completion of the work of the tenth census,—the depleted state of the census appropriation at an early stage of the work; the resignation of General Walker as superintendent in less than a year and a half after the commencement of the enumeration; the subsequent illness and death of Mr. Seaton, the former chief clerk, who succeeded him as superintendent, and the abolition of the Census Office early in 1885, although the publications of the census were in no wise completed,—had a very great influence in producing conditions which did not operate to the advantage of the commencement of the work of the eleventh census. The final completion and publication of the reports of the tenth census extended very nearly to the close of the period from 1880 to 1890, the last

volume hardly having been given to the public when the preparatory work of the eleventh census was begun, and, in fact, some of the subjects of inquiry, for which a good deal of matter had been collected and prepared, were finally abandoned and no results were ever printed.

The Census Office having been abolished meanwhile and a census division established in its place, the remnant of the census force was kept busy with the effort to complete the publication of the census reports, and the chief of this division, who afterwards became the census clerk, had no time to pick up the threads in readiness for the work of the eleventh census. This was not the fault of the census clerk, however, but the inevitable result of the temporary system under which he was compelled to work. It is true, nevertheless, that the records of the tenth census were not in good shape to be used readily in connection with the preparatory work of the eleventh census, and, as a matter of fact, consisted largely of a "mass" of material, of great weight and bulk, which had been moved from place to place, as each branch of the work was closed up, until it finally found a resting place in the depository of census matters in the Department of the Interior building. This mass of material, consisting principally of waste paper, contained a few nuggets of census information but no "precedents" upon which to base intelligent action, and required many weeks of hard work on the part of several laborers before it could be put into condition for practical use, so far as it had any real value in shaping the work of the eleventh census.

It was not the original purpose to have the tenth census duplicated, and yet the law of March 1, 1889, under which the eleventh census was taken, supplemented by later legislation requiring information as to "farms,

homes, and mortgages," resulted practically in as many different subjects of inquiry and as many volumes constituting the final report, but perhaps more nearly statistical in their character and containing less historical and technological matter. In effect, however, the eleventh census was just as comprehensive as the tenth and the work was carried on under practically the same conditions of temporary organization, that is, an entirely inadequate length of time in which to prepare for the work, a more or less fitful life under varying political conditions, a considerable but unavoidable delay in the publication of the final reports, and a gradual contraction from 25 divisions in the Census Office to a single census division in the office of the Secretary of the Interior, and finally to a single census clerk, guarding about the same bulk of census "records." And the census soon to be taken, the twelfth, is likely to comprehend very nearly as many particulars, as there is very little reason to suppose that the scope of the census will in reality be lessened.

If the proposed legislation is finally effected,[1] however, the attempt will not be made to cover, as in 1880 and 1890, the entire range of subjects at one and the same time, resulting in much perplexity and often times confusion of effort, but the four most important subjects of inquiry will be taken in hand first, at the time of the decennial enumeration, and the less urgent, if not less important, topics reserved until a later period. In this proposal to distribute the work over the full period of ten years, if need be, lies, moreover, the hope of the twelfth census. It would have been better to have had an office established fully two years before the period of enumeration, but failing in that, it will at least be an

[1] For the main provisions of the new law see appendix to this volume.

improvement over its immediate predecessors to have the decennial work limited to a few subjects, to be carefully and accurately enumerated and prepared for publication before any of the special subjects proposed shall be investigated; or, in other words, that none of these special investigations shall be allowed to interfere, in any way, with the early completion of what the bill terms the "census reports"—those relating to the population, agriculture, manufactures, and vital statistics of the country.

It is apparent from what has been said that, while the comparatively simple decennial enumeration of population instituted in 1790 has expanded, in recent enumerations, into an extremely comprehensive census, so far as the number and variety of subjects considered are concerned, and in this aspect of the case has kept fully abreast of the great increase in the population of our country and the wonderful development of its resources, yet the system under which the census has been taken, even though it may have provided adequately, perhaps, for the increased number of the subjects to be investigated in point of money and force to do the work, has not been perfected along the lines which would provide sufficient time for the necessary preparations and for the continuous services of a force of experts trained at least in the practical work of census taking.

In these two very important particulars,—lack of time to prepare for the work and lack of a trained force to do the work,—the census legislation, in recent years especially, has been sadly deficient, and it is largely on account of these two things that the effectiveness of census work has been lessened and its accuracy and reliability questioned. All the faults of the census, particularly at the last two enumerations, aside from the

faults which are inherent in the census itself, can safely be set down to these two causes, and until this condition of affairs is remedied, the credibility of the Federal census will be doubted and criticisms made which can not be successfully refuted. And still at the same time, it must be remembered, no one official or set of officials can be held responsible. There is no question as to the integrity of the officials who have been charged with the prosecution of the work, nor can the conscientiousness of their efforts, working under such a system, be doubted for a moment. And unless this point is made clear beforehand, that the system is mainly at fault, criticism of the census, no matter by whom or for what purpose, is not fair, especially when that criticism, however just, carries with it an implied, if not always expressed, criticism of the men charged with the execution of the work, who are thus made responsible for all the imperfections of the census of whatever kind.

It should also be borne in mind that the officials charged with the prosecution of the census have had no hand, as a rule, in shaping the legislation which governed their work, and although some things from the standpoint of practical experience might have suggested themselves, there was no time after their appointment to effect any material change in the census act. The law specifies certain things to be done and indicates the machinery with which it shall be accomplished, and the superintendent, who has had no voice in molding the law, is compelled to carry out its mandates to the best of his ability, with the material at hand, and with little time in which to make his preparations for accomplishing the truly herculean task of taking a census of the population, wealth, and industry of the country, as the law expressly provides.

The real work of the census consists of the three grand divisions of enumeration, tabulation and presentation, comprehending, first, the collection of the data by the various agencies employed, whether enumerators, special agents, or by correspondence; second, its classification and arrangement in accordance with well-matured plans and methods; and third, its proper analysis and presentation within a reasonable length of time after the completion of the actual field work. These three divisions of the census work, as now projected, involve, however, an amount of preparatory work well-nigh beyond the power of any one man, however well trained he may be in census methods and without reference to the degree of zeal and enthusiasm with which he may enter upon his work. And this is particularly true, when the limited time that is given for preparations and the conditions under which it must be prosecuted are considered. The requirements of the eleventh census in these particulars afford sufficient data from which may be deduced the probable conditions that will obtain with respect to the preparatory work of the twelfth census.

The eleventh census was taken under the provisions of the act approved March 1, 1889, which directed that a census of the population, wealth, and industry of the country should be taken as of June 1, 1890, and that for this purpose a Census Office should be established in the Department of the Interior, and a superintendent of the census appointed by the President, to have, under the direction of the Secretary of the Interior, the superintendence and direction of the census work. The first step in the organization of this office was not taken, however, until very nearly two months later by the appointment on April 17, 1889, of Hon. Robert P. Porter

as superintendent of the census. This gave a little more than thirteen months in which to prepare for the work of the eleventh census, or substantially the same length of time as was given for preparations at the tenth census, which it followed very closely, both in scope and methods.

When Mr. Porter came to Washington to begin his preliminary work, there remained, as already stated, but a single officer out of all the brilliant array of chiefs and experts who had been gathered together by General Walker in 1880 and who had contributed so fully and freely of their knowledge and attainments to make that census, with its many varied and specialized features, such an encyclopædic affair. This legal holdover, known in the office of the Secretary of the Interior as the "census clerk," was the only person, therefore, from whom any specific information could be obtained as to the condition of the records and papers relating to that census, which might have a bearing upon the work of the eleventh census.

Starting then with but a single clerk, the superintendent of the census had to begin his work at the bottom, and with but few records and no precedents to guide him, he had not only to seek persons of experience to assist him, but also to find temporary quarters and to make contracts for suitable buildings, to be erected in time for the census operations, in which to house the millions of schedules and blanks to be printed and used by a small army of enumerators and agents, and in which further to provide adequate quarters for a somewhat smaller, but no less industrious body of clerks soon to be called to make the great count of population and to compile all the varied statistics comprehended by the census act. These entirely preliminary matters at-

tended to, his next duty was to devote his energies to the real work of preparing for the decennial enumeration—the house-to-house canvass,— involving the division of the country into 175 supervisors districts, one or more to each state or territory ; to find suitable persons to be recommended by the Secretary of the Interior for appointment by the President as supervisors ; to instruct the supervisors, when appointed, in the duties required of them under the census law ; to institute the geographical work of the census, by which the division by each supervisor of his district into subdivisions convenient for enumeration, very nearly 50,000 in number, and subject to the superintendent's final approval, could be properly and intelligently scrutinized, and to determine, so far as possible, the boundaries of the many thousands of minor civil divisions of varying character and organization, for which a separate return of population should properly be made ; to approve the lists of persons selected by the several supervisors to act as enumerators within their respective divisions ; to fix in advance the rates of compensation of enumerators, according to the nature of the region to be canvassed, the density or sparseness of settlement, or other equally pertinent considerations ; to prepare the various schedules and blanks to be used by the enumerators in their work, and the detailed instructions concerning the manner in which they should be filled ; to provide properly for sending these schedules, blanks, and instructions, when printed, and numbering upwards of 25,000,000 in all, in sufficient quantities to meet every requirement of the enumeration, and in ample season to have the work commenced on the first Monday in June in every part of the three million or more square miles of territory to be canvassed ; in short, to bring into active operation

every agency and resource necessary to a prompt and thorough canvass of the country, conducted in such a manner as to insure a substantially accurate and complete record by the enumerators with respect to the population, the products of agriculture and of manufactures, the statistics of mortality, the afflicted classes, and of crime, pauperism, and benevolence, and, finally, the special record of service required concerning the Union survivors of the civil war. But this was not his whole duty. While preparing for the general enumeration, he had to receive and consider thousands of applications, presented in person and by proxy, for positions in the census, and to devise a system of examination by which their general fitness could be determined; to examine the many projects and propositions brought to his attention, not contemplated, perhaps, by the census act in specific terms, but possessed of sufficient merit to warrant careful consideration under the discretionary power given to the Secretary of the Interior over the form of the schedules of inquiries to be by him prescribed; and, in addition, to outline the plan and the methods to be pursued in conducting the many special branches of census inquiry, which were to be carried on without reference to the general enumerators, and many of which, not being dependent upon the decennial period, could be instituted at once; that is to say, complete statistics concerning the fisheries, mines and mining, education, churches, insurance, wealth, debt and taxation, the various agencies of transportation, and the recorded indebtedness of private corporations and individuals, besides a special enumeration of all Indians, taxed and not taxed, living within the jurisdiction of the United States, and a separate census of the population, wealth, and resources of Alaska.

It should be remembered, too, that due consideration for the demands of statistical science required that every preparation for the general enumeration or for the prosecution of the special features should be made with reference to the tabulation and presentation of the material collected, in order that the results of the census, and the conclusions to be derived from them, should not rest on a false basis, but present a correct and true statement of the conditions of population, wealth and industry as they existed at the decennial period.

This, in brief, was the work "cut out" for the superintendent of the eleventh census to provide and prepare for in thirteen months, and from this summary it is easy to realize that the task that is likely to be set for the director of the twelfth census cannot differ much from what was actually required in connection with the preliminary work of the eleventh census. The time given for preparations for the twelfth census cannot much exceed that allowed at the tenth and eleventh censuses, and the amount of preparatory work to be done is, for all practical purposes, equal to that necessary to the eleventh, with the exception that the director will not have quite so many subjects over which to divide his time and attention, and that for no subject of investigation, as now contemplated, will it be necessary to commence the field work prior to the time of the general enumeration; but the detail of preparation for the decennial work, involving the house-to-house canvass, will not be lessened in any degree, and will severely tax all the energy and application of which the human frame is capable. Two years is none too long for making the necessary preparations, but, unfortunately, this is out of the question with respect to the work of the twelfth census, and barely half that period will remain available

after the necessary organization has been effected. To institute the work of the census under such conditions is indeed a great task, and one before which, in the merest contemplation of the possibilities of disaster, the strongest man, in vigor and equipment, may well quail.

Realizing, then, the conditions under which the work must be entered upon, requiring haste in every preparation, it is at least a consolation to know that relief is promised in two directions, first, in the limited number of subjects to be canvassed at the decennial period, as already stated, and second, in the better organization proposed in the way of securing to the director the services of an assistant director, who shall be an experienced, practical statistician, and of five chief statisticians, who shall be persons of known and tried experience in statistical work.

These changes are in the right direction. They affect not only the work of the director of the census, in the way of lightening his preliminary duties and giving him the chance to secure the services of expert assistants, but the limitation of subjects to be investigated has a very great bearing upon the work of the general enumerators. They should be charged with but a few matters,—the fewer the better, under present conditions,—if the requirements of the house-to-house canvass are to be fulfilled intelligently and with due regard to the accuracy and completeness of the answers to be returned. At the eleventh census, the majority of the enumerators were charged with the duty of returning answers to very nearly seven hundred inquiries or details concerning the general population, the products of agriculture and manufactures, the decedents, the defective, dependent and delinquent classes, and the Union survivors of the civil war. Under the provisions of the

census act, the inquiries relating to manufactures could be withdrawn from the general enumerators in the cities and important manufacturing centers, while those relating to mortality could also be withdrawn in states and cities where a fairly satisfactory system of registration was in vogue. Again, too, the inquiries concerning agriculture would not be particularly applicable in closely-settled districts, so that the burden of the work in this respect would not have much effect upon the enumerators in such areas. But making allowances for all these considerations, the fact still remains that in very much more than one-half of the districts, the number of possible inquiries to be made by the enumerators was very nearly seven hundred. The policy of the census officials is to lighten the work of the general enumerator, so far as the law will permit and the exigencies of the case will allow, and the principle, established by the law of March 3, 1879, of employing experts and special agents without regard to locality to collect the data not directly dependent upon the house-to-house enumeration, was made use of to a considerably greater extent in 1890 than in 1880, with a corresponding increase in accuracy and more complete details secured; and it is a source of gratification to know that under the legislation proposed for the coming census, a much less number of inquiries will have to be asked, as a rule, by the enumerators charged with the decennial canvass to be made as of June 1, 1900.

The provision for three hundred supervisors in 1900 is another change in the right direction. There were one hundred and fifty supervisors at the census of 1880 and one hundred and seventy-five at the census of 1890, or, on the average, about one supervisor to each third of a million inhabitants; so that no gain was made in this

respect in 1890 over 1880, but with the increased number proposed for the census of 1900, there will be, on the basis of 77,000,000 inhabitants, an average of one supervisor to each quarter of a million persons to be enumerated. This means, after allowing for the appointment under the law of a supervisor for each state and territory where the population will either fall below or not much exceed a quarter of a million, say in twelve or fifteen instances in all, the opportunity to divide the remainder of the country into comparatively compact districts, with a relatively small number of inhabitants in most cases. It will also enable the director, if he so desires, to have the enumeration of all cities of considerable size made under the immediate supervision of a resident supervisor especially appointed for that purpose, and, furthermore, to have the work carried on under his direction in co-operation with the city officials, so that there shall be no reason why the canvass may not be made as complete and satisfactory to all parties concerned as the nature of the work and existing conditions will permit. Such an arrangement, too, will largely overcome the fault at preceding censuses, owing to the limited number of supervisors, of having, with few exceptions, no one in direct charge of the enumerators employed in taking the census of the larger cities, and will obviate the necessity, as has often been suggested, of designating one of the enumerators, in the interest of an accurate census, to act as chief enumerator or assistant to the supervisor, to have the immediate charge of the work in such cities where the supervisor's district comprises more territory than that embraced in a single city, and of which the supervisor may not be a resident or have therein his headquarters. Anything that reduces the size of the district to be supervised and con-

centrates the efforts of the supervisor over compact and well-defined areas is an improvement and will have a tendency, at least, to ensure better and more complete returns.

With the larger number of supervisors' districts, resulting in a somewhat smaller number of enumeration districts, on the whole, to be handled by a single supervisor, will also come the benefit of the greater local knowledge on the part of the supervisor of the territory under his jurisdiction; a better subdivision, in conjunction with the census officials, of the territory into enumeration districts; a more intimate acquaintance with the minor civil divisions included in each enumeration district for which a separate return of population is desirable; more direct and personal contact with the enumerators selected and appointed by him in his district; and the opportunity, if time will allow, for instituting, without great expense, some preliminary test for determining the general fitness of the applicants for appointment as enumerators and their knowledge of and familiarity with the printed instructions to be followed in the prosecution of the decennial work.

The increase in the number of supervisors' districts does not mean necessarily any increase in the number of enumeration districts. The limit as to size proposed for an enumeration district in 1900 is the same as at the censuses of 1880 and 1890, namely, not to exceed 4,000 inhabitants, to be determined at the census of 1900 according to estimates based upon the last census or other reliable information. On the basis of the number of regular enumerators[1] at the last census, or, in round

[1] Excluding "institution" enumerators, that is, those appointed for the pupose of enumerating the population in the large institutions of the country,—generally the clerk or other official having access to the

numbers, 43,500, and assuming an aggregate population in June, 1900, of 77,000,000, the average size of the districts would be less than 1,800; if, on the other hand, it were possible to equalize the districts so that they should average, approximately, 2,500 persons, but 30,800 enumerators would be needed; or if the average is raised to 3,000 there would be between 25,000 and 26,000; and if the full limit of 4,000 is nearly maintained, there would be less than 20,000 enumerators in all. So that it is easy to see that with the relatively large increase in the number of supervisors and a decrease, if anything, in the number of enumerators, if a fair average population to an enumeration district is maintained, much closer supervision of the work of the enumerators can be had with correspondingly better results, if the necessary and proper provisions are made therefor. In the direction of a better and more intimate acquaintance with the characteristics of the district to be canvassed, and the consequent designation to be made beforehand and the specific instructions given to each enumerator concerning the areas within his enumeration district for which the population should be separately stated, this provision of the law governing the work of the twelfth census is a marked advance over its predecessor. And in the matter of securing a correct return of the population of the lesser divisions of the country, that is, the small incorporated cities, villages and places included within the areas of towns and townships, and often bearing the same name as the town or township of which it forms a part, there seems every reason to expect much better results than

records of such institutions,—and the small number appointed to re-enumerate districts where the first enumeration was incomplete or improperly done.

were possible under the conditions that obtained at the census of 1890. There is not much more time, it is true, but with the larger number of supervisors and the relatively smaller districts to be supervised, there should be considerable improvement in this respect. If such should prove to be the case, in fact, it will be a source of gratification in more ways than one. No more difficult task was imposed upon the officials at Washington at the last census than to determine from the returns of the enumerators the correct population of the minor civil divisions of the country, the Census Office in hundreds of cases being compelled to make the statement in the table of population by minor civil divisions that the population of the specified area was not returned separately from that of the town or township of which it formed a part. The failure on the part of many of the enumerators to make their return of population in such a manner as to enable the Census Office to determine the correct number of persons living within these smaller areas on June 1, 1890, resulted in much confusion and many legal complications, and this, too, in spite of the fact that an attempt was made by the Census Office after the completion of the enumeration to supplement the work of the enumerators by means of correspondence with the local officers and by sending lists of persons enumerated for their guidance, in an effort to determine these populations, at an expenditure of several thousand dollars and much labor, but oftentimes with very poor success. These omissions were often a source of much annoyance and trouble, especially in those cases where state law made it obligatory in the absence of definite information through their own state or local censuses, to have the Federal census taken as the basis in fixing the population of certain areas. This was notably the

case in New York state where the excise law provided that the amount of the tax should be determined in proportion to population, under a classification fixed by the excise law, but based upon the return of population for such areas as shown by the last Federal census (that of 1890). It happened, however, that in New York the population of very many of the villages, often having the same name as the towns in which they were situated, was not separately stated in the report of the Federal census, and as under the law they could not be otherwise determined, a much smaller excise tax was collected than was actually allowable, but which the courts, after much litigation and delay, decided could not be exacted, and which resulted in the loss to the state and municipalities affected of thousands of dollars of revenue from this source. This is but a single instance, with which the writer is personally conversant, but there is no doubt that much trouble and possibly litigation were occasioned in other directions from the failure of the census enumerators so to make their returns as to render such omissions impossible. It was not possible to have prevented this condition of affairs through the efforts and instructions of the census superintendent and his assistants as a part of the preliminary preparations for the enumeration, as the time was so limited that, in many cases, the subdivision of districts by supervisors, which should have received careful scrutiny and examination before acceptance, had to be approved with little or no examination, and in some cases by telegraph without any examination whatever; and this involved, in such cases, as a matter of course, the acceptance of the lists of enumerators designated by the supervisors without any opportunity on the part of the census officials to determine, in the most cursory way, their general

capacity for the work. Some of these conditions are likely to occur at the census of 1900, through lack of time, as in 1880 and 1890, but heroic effort should be made by the director of the census to overcome, so far as possible, these particular deficiencies in the enumeration; and this is all the more necessary, inasmuch as the proposed bill provides that the subdivisions established for the purposes of the enumeration shall be declared and the boundaries fixed by the Director of the Census, after consultation with the several supervisors of census.

The legislation proposed for the twelfth census, in addition to limiting the decennial work to four subjects, defines the topics concerning which inquiry shall be made, but gives the director of the census discretionary power as to the number and form of the inquiries necessary to secure the desired information. In view of the limited time in which to prepare for the work, and the desirability of having a reasonably prompt publication of the results, this provision seems fair and proper, as without some restriction relative to the scope of the inquiries to be made, the tendency is always to ask too much, to undertake too elaborate an inquiry, for fear possibly that in the hurry of preparation something will be left out that upon later consideration may be deemed essential to the completeness of the topic under investigation. In this way many useless data are apt to be collected, which it is impossible properly to classify and reduce to practical form, with any ordinary expenditure of time and money. It is in the interest of accurate results, therefore, to limit the scope of the inquiries to be made by the census enumerators, as under the best of conditions it is difficult to prepare the instructions beforehand so as to meet every contingency of the work and to answer every query which may arise in

the mind of the enumerator. Indeed, it is hard to get thoroughly intelligent and efficient persons to act as enumerators, and the simpler the work is made and the fewer the inquiries asked, the better will be the results achieved. The experience of the past teaches that the amount of work required, the length of time employed, and the usually inadequate compensation allowed have had a tendency to deter the better class of persons from undertaking this work, and the results of the census have had to suffer for these reasons. This is not alone true of this country, but a similar experience has been reported in connection with the census of Great Britain. The brief period of employment and small compensation have operated there in the same direction as here, and the persons appointed as enumerators have not averaged any better than in this country, although they have there a nucleus force to supervise the work, in the registrars and sub-registrars, whose business it is to deal with records and who have some apprehension of the difficulties in the way of getting complete returns through the ordinary census channels and a thorough appreciation of the desirability of having the services of intelligent and painstaking persons to do the actual work of enumeration. In spite of this, however, the work of securing competent enumerators has not been altogether successful, and in many cases, as in this country, the offices have gone begging and have been filled more from reasons of charity than from the ability of the persons selected properly to do the work. In this country, attempts have been made to make the pay better, and increases have been made at each census, but these increases are not wholly based upon data derived from the records of the preceding censuses, as would be the case if a permanent office

was in existence and there was time in which carefully to apportion the various rates, with a full knowledge of the characteristics of the several districts and the difficulties to be met in the enumeration in the various sections of the country. Per diem rates of pay offer the only solution of these difficulties, but they are not possible now, perhaps, on account of the lack of time in which to provide the necessary checks and safeguards against delays, instituted solely for the purpose of prolonging the work with a view of increasing the total amount of compensation to be received. These checks and safeguards would increase the cost of supervision, it is true, but it would simplify the work in every way, and would have the further advantage of offering beforehand a fair day's pay for an honest day's work and, if proper means were devised to prevent, would not result in a wholesale swindling of the government. I doubt, too, if the cost of this additional supervision would be much greater than will now be the case, if the supervisors are charged with the duty of examining the returns on the various census schedules, as the bill now pending contemplates, in order to determine the correctness of the accounts of the enumerators, to be certified to by said supervisors and to be accepted and paid by the Director of the Census upon such certification, without any verification on the part of the central office at Washington. It means the count of population in each enumeration district by the supervisor thereof, and a summary, in each case, of the number of deaths returned and of farms and establishments of industry enumerated, in order to verify the statements of the enumerators in each of these particulars. In this connection, too, it should be borne in mind that the supervisors of census, as a rule, have had no experience

in census work, and are unaccustomed to the great rush of work that is inevitable, under present conditions, at the decennial period. They, too, need supervision and guidance, and with the multiplicity of inquiries likely to be made of them by the enumerators of their several districts will be kept fully occupied during the full period of the enumeration and cannot take up the work of examining the returns until the canvass of their district is substantially completed. If per diem rates of pay could be safely established throughout the country, the supervisors would be alone charged with the duty of examining the enumerators' returns solely with reference to the completeness of the canvass made, and the census officials at Washington could readily determine whether the time occupied in the enumeration was a fair average in accordance with similar work done in any particular section of the country, and it would only be in those cases where, from the small amount of work performed and the relatively long time consumed, it was manifest the work had been unnecessarily prolonged that the payment of the enumerators' accounts would have to be suspended for a more careful examination and explanation.

Upon the completion of the enumeration and the receipt of the schedules at Washington, the work of tabulation begins, and for this purpose a large clerical force must be organized and trained. Here again the temporary nature of the census system operates to the disadvantage of the work and entails a great burden upon the census superintendent in the selection from a host of applicants of the force necessary to perform all the various duties essential to the rapid and systematic compilation of the census returns. At the census of 1870 the clerical force was secured through an "office" ex-

amination instituted by the superintendent of the census, but at the census of 1880 no such examination was required and the clerks were selected without any preliminary test of their general fitness for the work. At the census of 1890, although the civil service rules and regulations covered the clerical force of the executive departments of the government, the census clerks and employees were not included, but their examination was left to the discretion of the Secretary of the Interior, and entrance to the work of the census was had by means of an examination conducted in the Census Office by a board of examiners appointed by the Secretary of the Interior. A somewhat similar provision is proposed to govern the clerical appointments for the census of 1900, but the stipulation is made that the examination to be prescribed, if any, shall have reference solely to the fitness of the applicant to perform the duties of the position to which he seeks appointment. This involves, as a matter of course, a world of labor on the part of the director of the census in meeting the demands for employment, usually far in excess of the needs of the service, at a time when his entire energies should be concentrated on the work of preparing for the decennial enumeration; but this is necessary, it is claimed, because of the temporary nature of the service to be rendered and the difficulty which would be experienced by the civil service commission in supplying quickly from their eligible lists, under any system of state apportionment, the necessary force to do the work, covering a limited period only. It is not the purpose, however, to discuss the general question of the relative merits or demerits of the civil service system as applied to the employees of the permanent offices of the government, nor does the writer believe that it is only possible

to secure good and thoroughly efficient clerks through the medium of the civil service law. At the census of 1890, the examination prescribed by the census office examiners was a fairly good test of the general fitness and ability of applicants to do the work for which their services were needed, but the point is clear that the reception by the superintendent of the applicants, and the hearing of their claims for preferment, took much valuable time which, under different conditions, might have been devoted to the more important duties of preparing for the work of enumeration and tabulation, operating to the general advantage of the census itself and to the physical relief of the superintendent.

In compiling the returns of the eleventh census, improved methods of tabulation were used, wherever practicable, and in the tabulation of what may be termed the "individual" statistics, that is, those relating to the living population, the decedents, the afflicted classes (deaf and dumb, blind, insane, feeble-minded, etc.), inmates of benevolent institutions, paupers, and criminals, the principle of using a "card," representing the individual as the unit of tabulation, was recognized for the first time in the Federal census. At the censuses of 1870 and 1880 the tallying system was used, by which the various details of color, sex, age, place of birth, parentage, occupation, etc., were tabulated direct from the original schedules upon tally sheets, singly or in such combination as could be readily obtained by the tally method. But the correlation of data possible under this method of tabulation, particularly if the classifications were at all extended, was exceedingly limited, even with the mechanical extension of the tallying method devised by Colonel Seaton and used in the ninth and tenth censuses; and it was largely on ac-

count of these limitations that experiments were undertaken which finally resulted in the electric tabulating system, invented by Mr. Herman Hollerith, and used in the work of the eleventh census in compiling the statistics of population, mortality, and of crime, pauperism, and benevolence. By the use of the Hollerith system of tabulation, all the information relating to each individual returned on the various schedules of inquiry was recorded on a manila card by means of holes mechanically punched therein, and these cards were then successively sorted and counted on the electric tabulating machines, in order to produce the various combinations of facts needed to make the statistical presentation of the data secured as complete and comprehensive as seemed in any way desirable. In the compilation of the statistics relating to the afflicted classes, and the population of Alaska, the card system of tabulation was also used, but the information was recorded on the card by written symbols and the cards were then sorted and counted by hand, as the limited number of persons involved did not warrant the use of the electric system of tabulation. In the other branches of the work, the returns related principally to the establishment and not the individual, and only required to be aggregated for each of the various areas and industries or in special classifications of which presentation was made in the final report.

If a criticism is made of the work of the eleventh census, in the matter of the tabulation and presentation of the returns, it would be perfectly fair and proper to say that, to a certain extent, perhaps, there is a lack of continuity of effort as compared with preceding censuses, and that, in certain particulars, there is a lack of coordination in the work of the census itself. These

deficiencies, wherever they appear, are chargeable, however, largely to the conditions under which the work was carried on, and not to any lack of effort or desire on the part of the census officials to remedy them. Each census is a law unto itself, and from the exigencies of the case each division of the census work is conducted largely without reference to the other branches of the work. The first lack arises from the fact that the basis of the classifications used at the preceding census has not been preserved and, aside from the published results, there are no records available by which it is possible to make an intelligent effort to secure exact comparison with the results of preceding censuses. The second lack is due to the fact that, in the hurry and worry of preparation for the great decennial work, there is no time, so to speak, for unifying the varied work of the census, but each branch has to be entrusted to some one more or less expert in such matters, with no one, aside from the overworked superintendent himself, to hold the reins and guide the great census machine through the tortuous channels of enumeration and tabulation to the final goal of publication. After the completion of the field work, even, the congested condition of affairs in the Census Office, produced by the attempt to cover fifteen or twenty distinct subjects of investigation at one and the same time and to tabulate and produce the results simultaneously, does not admit of thoroughly methodical prosecution of the work such as would naturally be expected to proceed from a stable basis of continuous work and organization, particularly with reference to the careful unification, under the immediate direction of the superintendent, of all the results of the census, wherever such unification was possible and desirable. The further point should not be lost sight of, that the

chief effort of a Census Office loaded down with a multitude of subjects of inquiry, as was the case in 1890, is to complete the work of tabulation and to get the results in the hands of the public at as early a day as possible. Under these conditions of haste, there is little chance for truly scientific work, and the delays that are inevitable, so far as the final publications are concerned, must be charged to the system and not to the officials entrusted with the work. Every effort is made by them to get the results before the public, and at the eleventh census this was largely accomplished at a comparatively early period by the use of the census bulletin, in which all the essential leading facts of that census were issued as fast as available, and many months in advance of the publication of the large quarto volumes containing all the minor details comprehended by the various presentations.

The better provision made for securing to the director of the census the services of expert statisticians and the distribution of the work contemplated by the proposed bill should have, if properly carried out, a marked effect upon the census in the particulars just noted, but the real remedy for existing evils and delays in census work is a permanent Census Office, properly equipped and administered, and working in harmony and in conjunction, so far as may be, with all related interests. The statistics gathered in this country through governmental agencies, national and state, and the minuteness of detail entered into, have excited the wonder of the world. Deficient as we undoubtedly are in registration statistics covering the entire country, still in almost every other field of statistical inquiry, investigation has not stopped at simple facts, but elaborate presentation of the most valuable data has been made, and the

general credibility of such statistics has not been questioned, because they are, in the main, the product of statistical offices permanently organized and thoroughly equipped to do efficient work. And until the census is put on the same basis of permanency and efficiency, the same precision of methods and generally-accepted belief in the substantial accuracy of the results will not be attained and ought not to be expected.

WILLIAM C. HUNT.

U. S. Department of Labor.

EXTRACTS FROM LETTERS.

In the Committee's report introductory to this series of papers, reference is made to an issue of a circular letter[1] to members of the Association in regard to criticism of the last census and recommendations for future inquiries. As stated, the circular letter was not successful. Only about sixty replies were received. It has not been thought worth while to make any summary of the answers to the first three questions, but in the answers to the question: Is there any special information which you think might be furnished by the twelfth census and which is not in the eleventh? there are suggestions which, although in many cases made also in some one of the papers, have been summarized in the following pages. One exception has been made to this treatment, in the printing of the answer of Mr. F. L. Hoffman in full. This contribution is so complete and suggestive that it does not bear condensation.

Additional age classifications of children and young persons at work are desired so that it may be possible to determine those under 14 and those under 16 years of age.

More detailed information is desired relative to city monopolies.

The scope of the census should be narrowed rather than widened. Population should be determined once in five years.

Returns should be made showing the distribution of the ownership of real estate for selected counties in different states, separating non-residents.

It is desirable to improve the statistics of the number of animals on farms. The number of sheep returned by the census varies materially from the numbers given in the reports of wool-growers.

[1] See above p. 1, footnote 2.

The statistics of indebtedness of cities should include the amount of county, school district, drainage district, etc., debt, which must be met by taxes on the property within the city.

More information is desired in regard to the rates, cost and net profit of municipal water and lighting undertakings.

A comparative statement for the nineteenth century is desired showing the decennial growth in national area, population, wealth, developed resources, facilities for education, transportation, transmission of intelligence, and the opportunities for gainful employment.

It is suggested that the census, or some other government statistical agency, should work out the velocity of circulation or activity of bank deposits distinguishing accounts drawing interest from those not drawing interest. "The activity is the quotient of the annual checks drawn divided by the average amount of deposits. In this connection statistics of the relative amount of checks passing through and not passing through the clearing-house might be given. All figures should extend back several years to include hard times, panic of 1893, etc. The character of the figures and their importance are worked out for continental Europe by Pierre des Essars, *Journal de la Société de Statistique de Paris*, April, 1895, p. 143."

The census might well add to the statistical statements of quantities, indications of the probable error in those statements.

Agricultural census should give more complete information as to farm values in dollars.

Care should be taken to make the bulletins as serviceable as possible. For this purpose a condensed table of contents of all the preceding numbers might be published with each last issue.

The collection of the statistics of corporations is recommended.

It is hoped that the scope of the census will be restricted to those facts which, if collected at all, must be taken with the enumeration of population; also that *the final reports will contain the schedules and all instructions to enumerators and special agents.*

There should be details as to the unemployed, statistics in regard to social societies, secret societies, and labor organizations. The preparation of the census should be continuous. There should be co-operation between state and Federal governments and thus a reliable census might be secured at least every five years. Information might be furnished and distributed by school teachers in localities. Further information is desired as to the sources of the statistics published.

Returns should show where land in each state is owned, and whether the ownership is in a corporation or not. This might be made in connection with mortgage inquiries.

In municipal statistics, it is recommended that if the public utility be owned and operated by the city, the facts should be stated.

The sums expended for education in private, sectarian, non-sectarian, common schools, colleges, universities, should be stated so as to compare those with public schools as to economy and attendance.

It is recommended that many of the statistics regarding cities and states should be obtained annually. The scope of the census should not be cut down.

Additional investigation and special reports on important selected industries would be valuable.

Because of the inaccuracies of enumeration of the last census, it is recommended that no supervisor or enumerator should have charge of work in the district from which he is appointed; establish more severe penalties for fraud.

Data as to the extent, condition, and value of the forests should be secured.

It is suggested that a census of the more important farm implements and machines should be made.

Returns as to the maximum capacity of mines and manufactories should be secured.

The scope of the census should be restricted rather than extended. If there be an extension, it should be in the compilation of municipal statistics from official sources.

The census should present death rates, not proportional deaths, from all causes and from each specified cause of death for every state in the Union, and not merely for the registration states. For the non-registration states, and for the registration states as well, the census should state the approximate degree of accuracy of the returns.

Information should be gathered from individuals in regard to the amount of money on hand, not in bank, and the balance of credits over debts.

The statistics of foreign born are not sufficiently definite. The questions in regard to parentage should be more definite.

Special inquiries should be subordinated to the enumeration of the population.

In the treatment of mortality statistics, the census should show how many persons enter upon each year of age and how many complete it, thus furnishing material for a population table of mortality.

Reliable statistics concerning the days of sickness experienced in each year of age are needed. These statistics ought to be classified by occupation and residence.

Statistics should show the number of persons killed in each occupation, by accident, and the number injured, together with facts concerning length of time disabled, extent of disability, and number of persons dependent.

There should be more expert supervision of local enumerators. This might be done by more checking and also by securing local expert assistance.

Convinced that the Census Office should be a permanent institution; the reports should be kept within more moderate dimensions than those of the tenth census.

Statistics of expenditures of cities should be arranged differently.

It is desirable to secure statistics of the number of all private corporations with their capital stock, in each state and territory, together with amounts at par of capital stock actually issued, and objects and duration of charter in each case or class of cases; also similar statistics as far as obtainable for each decade previous to 1890.

In tabulating the data of farm tenure there should be given the total number of acres in each group of farms, those under 10 acres, those between 10 and 20, as well as the number of farms in each group.

Data for forest products should be secured for the next and possibly one or more succeeding censuses. The data should be secured by a special investigation, and published in an appendix apart from the volume on agriculture. The average enumerator is likely to know so little of forestry and its allied branches that the data secured through him would be very unreliable.

In regard to the data of wheat raised and consumed there is great room for progress both by the census and the Department of Agriculture. Special efforts should be made to obtain returns for all agricultural lands. The land missed is tilled largely by owners residing in towns and engaged for a portion or the whole of their time in some other business. The lands properly classed as agricultural and which were missed in two or three of the last censuses constitute at least 10 and possibly 20 per cent of the farm lands in nearly all the states of the Union. The trouble is with the enumerators, and will never be wholly obviated until the census is taken out of politics.

A special census is desired of the condition of the negro, his progress in art, industry and accumulation of property, "a very much more important subject than the treatment of the Indian."

Enumeration of the population and occupations might well be printed together, or occupations immediately following enumeration. An error is made in putting fisheries and mining with agriculture. They have vitiated comparisons. Mining would be much more suitably put among manufacturing industries, while fisheries might well be treated separately. The general statistics in manufacturing are in bad form. They have been swelled decade by decade by adding departments under the title of "Manufacturing," which have been developed in very recent periods as collective industries, formerly conducted in isolated small establishments which did not come into the censuses; for instance, flour mills, meat packing, repairs of cars and engines. I propose therefore a new classification.

Class I. Occupations of a mechanical order.

Sub-class a. The individual work of the mechanic rather than the collective work of the factory; blacksmith, carpenter, repairs, millinery custom work and the like.

Sub-class b. Conversion of the crude products of the farm into their secondary products; bread through the bakery, flour and grist mill; slaughtering, tobacco stemming.

Sub-class c. Timber and its conversion into its secondary or its final products.

Sub-class d. Metal working of certain kinds which are necessarily conducted in various parts of the country; the manufacture of coke, gold and silver reducing and the like.

Sub-class e. Petroleum refining.

Sub-class f. Miscellaneous arts necessarily conducted in different parts of the country; artificial limbs, coffins, galvanizing, treatment of tar, turpentine and the like.

Class II. Occupations existing of necessity throughout the country according to conditions and almost of necessity domestic; agricultural implements, boots and shoes, butter, cheese and condensed milk; clothing, fertilizers, foundry and machine shop products; chewing tobacco.

Class III. Occupations very similar to Class II which are almost of necessity conducted within the limits of our own country, very few of the products being imported; bagging of flax, hemp and jute, varnished goods, iron and steel, leather, lime and cement, patent medicines, printing and publishing.

Class IV. Occupations which are customarily thought of and spoken of as manufactures, carpets, chemicals, cotton goods, glassware, hosiery, tobacco and cigars.

Class V. Articles of luxury, perfumery, jewelry, etc.

The inquiry in regard to farms and homes, proprietorship and indebtedness, should be repeated.

AGRICULTURE IN THE CENSUS, BY HERBERT MYRICK.

An effort was made in good faith to improve the agricultural features of the eleventh census over its predecessors. Some good work was done with special industries, such as fruits, flowers, vines, hops, etc.

For the bulk of the agricultural returns, as collected by census enumerators, no degree of accuracy can be claimed, except perhaps for the schedules from the more intelligent northern or eastern states. The plan of lumping the returns from five or ten farms on one schedule is pregnant with error. The entire absence of accounts or records on most farms, the ignorance of enumerators, the mistaken view of some farmers that census returns will influence their taxes, and the lack of time to devote to each farm, make the methods of previous censuses quite unreliable in collecting the general statistics of agriculture.

Bald evidence of this is seen in the eleventh census. It returned the total value of all agricultural products in 1889 as 2,460 millions of dollars. As a matter of fact, the average farm value in December that year of the six leading cereals, hay, cotton, tobacco and potatoes produced that season footed up $2,625,000,000. This was on the basis of returns from the United States Department of Agriculture, which at that time and for several years before and since were notoriously underestimated as shown by actual crop movements.

It is probable that had all other produce been properly included, the census of 1890 would have shown $3,500,000,000 as the value of farm products in the census year. We have made several computations on this point and in a general way they all agree.

The first thing to insure accuracy in any branch of census work is to secure the most capable man for superintendent of the census, under a law that will enable him to select his assistants and the enumerators according to their ability and independent of their politics. Unless this is done, much of the work and money expended on the twelfth census will be thrown away, if not worse.

To secure a correct agricultural census, each farm in the country must be considered as a unit. There must be a separate schedule for each farm just as with manufacturing establishments. Each enumerator should deliver a schedule to each farmer in his district, explaining it to him and assisting him in making it out properly. Even with this precaution, there will at best be a large element of guess work.

Duplication of produce or of raw and manufactured materials is to be guarded against. More accurate data are needed of the various special crops and comparatively minor sources of income. And all these data should be so edited and presented as to be of some direct practical value to the vast interests involved.

NOTES ON THE SCOPE AND METHOD OF THE TWELFTH CENSUS BY FREDERICK L. HOFFMAN.

First—The final cloth bound volumes should be more strongly bound than has been the practice in the tenth and eleventh censuses. One year's constant use of a cloth bound volume will usually break the binding and require rebinding.

Second—The volumes on population and vital statistics should be published within two years after the taking of the census. This could unquestionably be done if the maps and diagrams were omitted. While the latter are valuable and interesting, they are not essential to those who make practical use of this part of the census.

Third—The final volumes should be distributed as soon as received from the public printer, and not, as has been the practice in the distribution of the eleventh census, within a year after the date of publication. For example—Part one of the report on vital statistics, transmitted under date of December 30, 1896, was not distributed until 1898. The delay in this case was largely due to the failure of the contractor to supply the maps and diagrams, which could have been left out without injury to the permanent value of the work.

Fourth—The volumes on life and fire insurance are hardly necessary since information under this heading is now being collected in a better form in the insurance blue books and the annual reports of insurance departments. The census returns relating to life insurance for the census year 1890 were transmitted to the Secretary of the Interior under date of August 25, 1894, printed in 1895 and distributed during the latter part of that year, whereas the same information was printed in the "Insurance Blue Book" and published and made available for practical purposes during the middle part of the year 1891.

Fifth—The volume on Mineral Industry would also seem unnecessary. In this case the publication was the very first of the official volumes, although as a matter of fact the least neccessary, since practically the same information was published in the annual reports of the United States Geological Survey and the annual supplement to *The Engineering and Mining Journal.*

Sixth—Population Statistics—The white and colored population of cities with more than 25,000 inhabitants should be given in detail for each census, as far as possible, since 1790. Information of this order is very valuable, and very difficult to abstract from the previous census volumes unless the student has at his command at least a complete set of the census returns since 1850. The country of birth and foreign parentage should be given for each nationality having more than 500 representatives in any given locality, and not as has been done in the eleventh census, merely for some of the more important nationalities, while the remaining nationalities are given in the aggregate (See page 685, Vol. 1, Population).

Information pertaining to the country of birth and foreign parent-

age of the Polish population should distinguish between natives of German Poland, Austrian Poland and Russian Poland. Information pertaining to the Russian population should exclude Russian Poles.

The age distribution of the population of cities should be published in the first population volume, since this information is always urgently needed in the computation of mortality rates for cities and rural districts of the states of this country.

Seventh—Taxation and Valuation—Information pertaining to taxation and valuation should be collected in such a manner that the assessed valuation of real and personal property would be shown according to race, and if possible according to nationality. Similar information showing the amount of taxes of various kinds paid by the White, Negro, Chinese and Indian population should be shown. The method to be employed is partly indicated in the annual reports of the state auditor of Virginia.

Eight—Mortality statistics should be given in all cases by five year age groups, and not by periods such as 25 to 44 or 65 and over. These periods are too long, and in many instances not comparable with information of a similar character. For ages over 65 information should be given in detail, especially in regard to the relation of conjugal condition to mortality, since the relation of married life to mortality cannot he traced with even a slight degree of accuracy unless the mortality at ages over 65 is given in more detail.

Ninth—Occupations—Information pertaining to the occupations of the people should be published in a separate volume, and at as early a date as possible. Information should be given in regard to every occupation, no matter how apparently unimportant. Thus for instance, the census of 1890 contains, so far as I know, no information pertaining to men employed in linoleum works, although some four establishments employ more than 800 men, nor as regards men employed in glass cutting establishments, although some 12 establishments employ about 1,250 men; nor does the census give any information as to men employed in the manufacture of the various forms of explosives, such as gun powder, dynamite, fuses and caps, ammunition and fireworks. Hence the necessity of detailed information pertaining to any and every occupation in which the people of this country may be engaged. Detailed information should be given as to the men employed in mining, and the present clumsy method of grouping miners as coal miners and other miners should be discontinued. Coal miners should be distinguished according to anthracite and bituminous coal mines, and further distinguished as working above ground and below ground. Metal miners should be distinguished according to the metal or ore mined, such as zinc, gold, iron, silver, quicksilver, etc. Additional information should be given as to whether employed as prospectors, placer miners, drift or deep miners. Information should be collected as regards the loss of life in transportation by land and water, as well as in the fishery industries. Occupations and the mortality from accidents should be stated in de-

tail to enable the student to ascertain the loss of life in any one of these occupations with an approximate degree of accuracy. Thus at present no information as regards the loss of life in the railway service by distinct occupations, such as engineer, fireman, brakeman, etc., is obtainable either from the census returns or from the annual reports of the Interstate Commerce Commission. The latter reports contain valuable information which, however, is given in groups such as trainmen, which includes engineers and brakemen, either of which is subject to a radically different accident liability. The method likely to bring about the most useful results would probably be to request information as to the loss of life resulting from accidents in all manufacturing industries. This would furnish valuable information pertaining to accidents and the loss of life in metallurgical establishments about which we at present know practically nothing. Care would have to be taken that in returns made by manufacturing industries or by transportation companies, the persons injured should be distinguished into those who were connected with the establishment and those who were not, as for instance, in street railways the number of persons injured would be mostly those who were not directly connected with the operation of this method of transportation. Finally, in collecting information pertaining to the occupations of the people every effort should be made to obtain supplementary information pertaining to the hygienic condition of the various manufacturing establishments. An immense amount of ignorance as regards the relation of occupation to health and mortality prevails at the present time, and most of those who have written on the subject have relied on statistical and other data collected in Europe where conditions affecting persons employed in industrial establishments are radically different from those existing in this country. Thus for instance, glass cutters in France and England are subject to an exceptional disease liability from lead poison and dust inhalation, but practically free from such dangers in the better conducted establishments in this country. The same holds true as regards men employed in the manufacture of linoleum, and partly as regards the employment of persons in the manufacture of high explosives.

Tenth—Government service—The census should contain detailed information pertaining to the United States Army and Navy, and also as regards every distinct branch of the government service. At present the census contains no information pertaining to men employed in light-houses, life saving service, etc., yet constantly questions arise which make it desirable that we should have this information in the census reports.

APPENDIX.

While this volume is going through the press, Congress has passed the fundamental law determining the scope and organization of the twelfth census. The first eight sections contain nearly all important points of difference between it and the similar laws of 1879 and 1889, and also the main provisions of interest to the student. Hence it has seemed wise to reproduce here these eight sections and to set in a parallel column the similar provisions of the law of 1889. The former are taken from the pages of the *Congressional Record* containing the report of the conference committee.[1] The other twenty-five sections being occupied with administrative details have been omitted.

W. F. W.

An act to provide for taking the Eleventh and subsequent censuses.	An Act to provide for taking the Twelfth and subsequent censuses.
Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a census of the population, wealth and industry of the United States shall be taken as of the date of June first, eighteen hundred and ninety.	Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a census of the population, of deaths, and of the manufacturing, mechanical and agricultural products of the United States shall be taken in the year nineteen hundred, and once every ten years thereafter.
SEC. 2. That there shall be established in the Department of the Interior an office to be denominated the Census Office, the chief officer of which shall be called the Superintendent of Census, whose duty it shall be, under the direction of the head of the Department, to superintend and direct the taking of the Eleventh Census of the United States, in accordance with the laws relating thereto, and to perform such other duties as may be required of him by law.	SEC. 2. That there shall be established in the Department of the Interior a Census Office, the chief officer of which shall be denominated the Director of the Census. It shall be his duty to superintend and direct the taking of the Twelfth Census of the United States, in accordance with the laws relating thereto, and to perform such other duties as may be required of him by law. The Director of the Census shall be appointed, as soon as practicable after the passage of this Act, by the President, by and with the advice and consent of the Senate, and
SEC. 3. The Superintendent of Census shall be appointed by the President, by and with the advice and con-	

[1] *Congressional Record* (March 1, 1890), 32 : 2864–2866 (original paging).

Law of 1889.

sent of the Senate; and he shall receive an annual salary of six thousand dollars;

and for the purposes of taking the Eleventh Census of the United States, the Secretary of the Interior may from time to time as the necessity therefor arises appoint a chief clerk and one disbursing clerk of the Census Office at an annual salary each of twenty-five hundred dollars, two stenographers, ten chiefs of division, at an annual salary each of two thousand dollars, ten clerks of class four, twenty clerks of class three, thirty clerks of class two, with such number of clerks of class one, and of clerks, copyists and computers, at salaries of not less than seven hundred and twenty dollars nor more than one thousand dollars per annum, as may be found necessary for the proper and prompt compilation of the results of the enumeration of the census herein provided to be taken. The disbursing clerk herein provided for shall, before entering upon his duties, give bond to the Treasurer of the United States in the sum of fifty thousand dollars, which bond shall be conditioned that the said officer shall render a true and faithful account to the Treasurer, quarter-yearly, of all moneys and properties which shall be by him received by virtue of his office, with sureties to be approved by the Solicitor of the Treasury. Such bond shall be filed in the office of the First Comptroller of the Treasury, to be by him put in suit upon any breach of the conditions thereof. And the Secretary of the Interior may also appoint

Law of 1899.

shall receive an annual salary of six thousand dollars; and there shall also be an Assistant Director of the Census, to be appointed in like manner, who shall be an experienced practical statistician, and shall receive an annual salary of four thousand dollars: *Provided*, That nothing herein contained shall be construed to establish a census bureau permanent beyond the Twelfth Census.

SEC. 3. That during the absence of the Director of the Census, or when the office of Director shall become vacant, the Assistant Director shall perform the duties of the Director.

SEC. 4. That there shall also be in the Census Office, to be appointed by the Director thereof in the manner hereinafter specified, five chief statisticians, who shall be persons of known and tried experience in statistical work, at an annual salary of three thousand dollars each; a chief clerk, one disbursing clerk and one geographer, at an annual salary of two thousand five hundred dollars each; five expert chiefs of division and two stenographers, at an annual salary of two thousand dollars each; ten clerks of class four, fifteen clerks of class three, twenty clerks of class two, and such number of clerks of class one, and of clerks, copyists, computers and skilled laborers, with salaries at the rate of not less than six hundred dollars nor more than one thousand dollars per annum, to be appointed from time to time, as may be found necessary for the proper and prompt performance of the duties herein required to be undertaken. The disbursing clerk herein provided for shall, before entering upon his duties, give bond to the Secretary of the Treasury in the sum of fifty thousand dollars, which bond shall be conditioned that the said officer shall render a true and faithful account to the proper accounting officers of the Treasury, quarter-yearly, of all moneys and properties which shall be received by him by virtue of his office, with sureties to be approved by the Solicitor of the Treasury. Such bond shall be filed in the office of the Secretary of the Treasury, to be by him put in suit

Law of 1889.

one captain of the watch at a salary of eight hundred and forty dollars per annum, two messengers and such number of watchmen and assistant messengers, laborers and skilled laborers at six hundred dollars each per annum, and messenger boys at salaries of four hundred dollars each per annum, and charwomen at salaries of two hundred and forty dollars each per annum, as may be found necessary to carry out the provisions of this act.

All examinations for appointment and promotion, under this act, shall be in the discretion and under the direction of the Secretary of the Interior.

Clerks transferred or detailed for service under this act from existing branches of the civil service shall not lose their positions or rights under the act to regulate and improve the civil service of the United States.

SEC. 17. That the schedules of inquiries at the Eleventh Census shall be the same as those contained in section number twenty-two hundred and six of the Revised Statutes of the United States, of eighteen hundred and seventy-eight, as amended by section seventeen of the act entitled "An act to provide for taking the Tenth and subsequent censuses", approved March third, eighteen hundred and seventy-nine, with such changes of the subject matter, emendations, and

Law of 1899.

upon any breach of the conditions thereof.

The Director of the Census may also appoint one captain of the watch, at a salary of eight hundred and forty dollars per annum; two messengers, and such number of watchmen, assistant messengers, and laborers, at salaries of six hundred dollars each per annum; messenger boys, at salaries of four hundred dollars each per annum; and charwomen, at salaries of two hundred and forty dollars each per annum, as may be necessary to carry out the provisions of this act.

SEC. 5. That the chief clerk and the chief statisticians provided for in section four of this Act, and all other employees authorized by this Act below the Assistant Director of the Census, shall be appointed by the Director of of the Census, subject to such examination as said Director may prescribe: *Provided*, That no examination shall be required in the case of enumerators or special agents, nor of employees below the grade of skilled laborers at six hundred dollars per annum. *And provided further*, That employees in the existing branches of the departmental service, whose services may be specially desired by the Director of the Census, not exceeding six in all, may be transferred without examination, and at the end of such service the employees so transferred shall be eligible to appointment in any department without additional examination, when vacancies exist.

SEC. 6. That the collection of the information required by this Act shall be made, under the direction of the Director of the Census, by supervisors, enumerators and special agents, as hereinafter provided.

SEC. 7. That the Twelfth Census shall be restricted to inquiries relating to the population, to mortality, to the products of agriculture, and of manufacturing and mechanical establishments. The schedules relating to the population shall comprehend for each inhabitant the name, age, color, sex, conjugal condition, place of birth and place of birth of parents, whether alien or naturalized, number of years in the United States, occupation, months unemployed, literacy,

Law of 1889.

modifications as may be approved by the Secretary of the Interior; it being the intent of this section to give to said Secretary full discretion over the form of the schedules of such inquiries: Provided, however, That said Superintendent shall, under the authority of the Secretary of the Interior, cause to be taken on a special schedule of inquiry, according to such form as he may prescribe, the names, organizations, and length of service of those who had served in the Army, Navy, or Marine Corps of the United States in the war of the rebellion, and who are survivors at the time of said inquiry, and the widows of soldiers, sailors, or marines: And provided, That the population schedule shall include an inquiry as to the number of negroes, mulattoes, quadroons and octoroons.

And he shall collect from official sources information relating to animals not on farms.

It shall be the duty of the Superintendent of Census, in addition to the duties now required of him by law, to ascertain the number of persons who live on and cultivate their own farms, and who live in their own homes, and the number who hire their farms and homes, and the number of farms and homes which are under mortgage, the amount of mortgage debt, and the value of the property mortgaged. He shall also ascertain whether such farms and homes have been mortgaged for the whole or part of the purchase money for the same, or for other purposes, and the rates of interest paid upon mortgage loans.—[*Amendment of Feb. 22, 1890.*]

Law of 1899.

school attendance, and ownership of farms and homes; and the Director of the Census may use his discretion as to the construction and form and number of inquiries necessary to secure information under the topics aforesaid. The mortality schedules shall comprehend for each decedent the name, sex, color, age, conjugal condition, place of birth, and birthplace of parents, occupation, cause and date of death, and, if born within the census year, the date of birth. The form and arrangement of the schedule and the specific questions necessary to secure the information required shall be in the discretion of the Director. The schedules relating to agriculture shall comprehend the following topics: Name of occupant of each farm, color of occupant, tenure, acreage, value of farm and improvements, acreage of different products, quantity and value of products, and number and value of live stock.

All questions as to quantity and value of crops shall relate to the year ending December thirty-first next preceding the enumeration. The specific form and division of inquiries necessary to secure information under the foregoing topics shall be in the discretion of the Director of the Census. The schedules of inquiries relating to the products of manufacturing and mechanical establishments shall embrace the name and location of each establishment; character of organization, whether individual, co-operative, or other form; date of commencement of operations; character of business or kind of goods manufactured; amount of capital invested; number of proprietors, firm members, copartners or officers, and the amount of their salaries; number of employees, and the amount of their wages; quantity and cost of materials used in manufactures; amount of miscellaneous expenses; quantity and value of products; time in operation during the census year; character and quantity of power used; and character and number of machines employed. The form and subdivision of inquiries necessary to secure the information under the foregoing topics relating to manufacturing and

Law of 1889.

Whenever he shall deem it expedient, the Superintendent of Census may withhold the schedules for manufacturing, mining and social statistics from the enumerators of the several subdivisions, and may charge the collection of these statistics upon experts and special agents, to be employed without respect to locality. In cities or states where an official registration of deaths is maintained, the Superintendent of Census may, in his discretion, withhold the mortality schedule from the several enumerators within such cities or states, and may obtain the statistics required by this act through official records, paying therefor such sum as may be found necessary, not exceeding the amount which is by this act authorized to be paid to enumerators for a similar service, namely, two cents for each death thus returned. The Superintendent of Census shall collect and publish the statistics of the population, industries and resources of the district of Alaska, with such fullness as he may deem expedient, and as he shall find practicable under the appropriations made, or to be made, for the expenses of the Eleventh Census.

The only volumes that shall be prepared and published in connection with said census shall relate to population and social statistics relating thereto, the products of manufactories, mining and agriculture, mortality and vital statistics, valuation and public indebtedness, recorded indebtedness, and to statistics relating to railroad corporations, incorporated express, telegraph and insurance companies, a list of the names, organizations and length of service of surviving soldiers, sailors and marines, and the widows of soldiers, sailors and marines.

Law of 1899.

mechanical industries shall be in the discretion of the Director of the Census. The information collected shall be of and for the fiscal year of such corporations or establishments having its termination nearest to and preceding the first of June, nineteen hundred.

Whenever he shall deem it expedient, the Director of the Census may withhold the schedules for said manufacturing and mechanical statistics from the enumerators of the several subdivisions in any or all cases, and may charge the collection of these statistics upon special agents, to be employed without respect to locality. In cities or states where an official registration of deaths is maintained, the Director of the Census may, in his discretion, withhold the mortality schedule from the several enumerators within such cities or states, and may obtain the information required by this Act through official records, paying therefor such sum of money as may be found necessary, not exceeding two cents for each death thus returned. The Director of the Census is also authorized and directed to make suitable provisions for the enumeration of the population and products of Alaska and the Hawaiian Islands, for which purpose he may employ supervisors and enumerators or special agents, as he may deem necessary.

The only volumes that shall be prepared and published in connection with the twelfth census, except the special reports hereinafter provided for, shall relate to population, mortality and vital statistics, the products of agriculture, and of manufacturing and mechanical establishments, as above mentioned, and shall be designated as and constitute the Census Reports, which said reports shall be published not later than the first day of July, nineteen hundred and two. The report upon population shall include a series of separate tables for each state, giving by counties the number of male persons below and above the age of twenty-one years, their

Law of 1889.

And said Superintendent may employ experts and special agents to investigate and ascertain the statistics of the manufacturing, railroad, fishing, mining, cattle and other industries of the country, and of telegraph,

Law of 1899.

color, whether native or foreign born, whether naturalized or not, and their literacy or illiteracy. All terms expressing weight, measure, distance, or value shall be expressed in the terms of the English language as spoken in this country.

SEC. 8. That after the completion and return of the enumeration and of the work upon the schedules relating to the products of agriculture and to manufacturing and mechanical establishments provided for in section seven of this Act, the Director of the Census is hereby authorized to collect statistics relating to special classes, including the insane, feeble-minded, deaf, dumb, and blind; to crime, pauperism and benevolence, including prisoners, paupers, juvenile delinquents and inmates of benevolent and reformatory institutions; to deaths and births in registration areas; to social statistics of cities; to public indebtedness, valuation, taxation and expenditures; to religious bodies; to electric light and power, telephone and telegraph business; to transportation by water, express business, and street railways; to mines, mining and minerals, and the production and value thereof, including gold, in divisions of placer and vein, and silver mines, and the number of men employed, the average daily wage, average working time, and aggregate earnings in the various branches and aforesaid divisions of the mining industry: *Provided*, That the reports herein authorized relating to mines, mining and minerals shall be published on or before July first, anno Domini nineteen hundred and three.

And the Director of the Census shall prepare schedules containing such interrogatories as shall in his judgment be best adapted to elicit the information required under these subjects, with such specifications, divisions, and particulars under each head as he shall deem necessary to that end. For the purpose of securing the statistics required by this section, the Director of the Census may appoint special agents when necessary, and such special agents shall receive compensation as hereinafter provided. The statistics of deaths and births provided for in

Law of 1889.

express, transportation and insurance companies as he may designate and require.

Law of 1899.

this section shall be obtained from, and restricted to, the registration records of such states and municipalities as possess records affording satisfactory data in necessary detail, in the discretion of the Director, the compensation for the transcription of which shall not exceed two cents for each birth or death reported. The statistics of special classes, and of crime, pauperism and benevolence specified in this section shall be restricted to institutions containing such classes: *Provided*, That at the time of the census enumeration the data relating to these classes may, in the discretion of the Director of the Census, be collected by the enumerators of such institutions, who shall receive compensation therefor at rates not exceeding, in per capita districts, five cents for each name enumerated and returned. The collection of statistics authorized by this section shall be made at such time or times and in such manner as will not interfere with nor delay the rapid completion of the census reports provided for in section seven of this Act, and all reports prepared under the provisions of this section shall be designated as "Special Reports of the Census Office."

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